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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No.	82,144
First Inventor or Application Identifier	Glenn G. Ward
Title	Operating Plan for Machinery
Express Mail Label No.	

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231

1. [X] * Fee Transmittal Form *(e.g., PTO/SB/17)*
(Submit an original and a duplicate for fee processing)
2. [X] Specification [Total Pages 52]
(preferred arrangement set forth below)
- Descriptive title of the Invention
- Cross References to Related Applications
- Statement Regarding Fed sponsored R & D
- Reference to Microfiche Appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings *(if filed)*
- Detailed Description
- Claim(s)
- Abstract of the Disclosure

3. [X] Drawing(s) *(35 U.S.C. 113)* [Total Sheets 5]
4. Oath or Declaration [Total Pages 2]
a. [X] Newly executed (original or copy)
b. [ ] Copy from a prior application (37 C.F.R. § 1.63(d))
(for continuation/divisional with Box 16 completed)
i. [ ] DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

5. [ ] Microfiche Computer Program *(Appendix)*
6. Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
a. [ ] Computer Readable Copy
b. [ ] Paper Copy (identical to computer copy)
c. [ ] Statement verifying identity of above copies

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ACCOMPANYING APPLICATION PARTS

7. [ ] Assignment Papers (cover sheet & document(s))
8. [ ] 37 C.F.R.§3.73(b) Statement *(when there is an assignee)* [X] Power of Attorney
9. [ ] English Translation Document *(if applicable)*
10. [X] Information Disclosure Statement (IDS)/PTO-1449 [X] Copies of IDS Citations
11. [ ] Preliminary Amendment
12. [X] Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
13. [ ] * Small Entity Statement(s) *(PTO/SB/09-12)* [ ] Statement filed in prior application, Status still proper and desired
14. [ ] Certified Copy of Priority Document(s)
(if foreign priority is claimed)
15. [X] Other: Appendix A
Appendix B
Appendix C

16. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in a preliminary amendment:*

[ ] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No: _____/_____

Prior application information: Examiner _____ *Group / Art Unit:* _____

For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS

[ ] *Customer Number or Bar Code Label* *(Insert Customer No. or Attach bar code label here)* or [X] *Correspondence address below*

Name	Office of Counsel, Code 004 Naval Surface Warfare Center, Carderock Division				
Address	9500 MacArthur Boulevard				
City	West Bethesda	State	Maryland	Zip Code	20817-5700
Country	USA	Telephone	301-227-1834	Fax	301-227-1968

Name (Print/Type)	Howard Kaiser	Registration No. (Attorney/Agent)	31,381
Signature	Howard Kaiser	Date	09/27/00

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TOTAL AMOUNT OF PAYMENT ($) 924.00

Complete if Known	
Application Number	
Filing Date	
First Named Inventor	Glenn G. Ward
Examiner Name	
Group / Art Unit	
Attorney Docket No.	82,144

METHOD OF PAYMENT (check one)

1. ☒ The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to:

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☒ Charge Any Additional Fee Required Under 37 CFR §§ 1.16 and 1.17

2. ☐ **Payment Enclosed:** ☐ Check ☐ Money Order ☐ Other

FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
101	690	201	345	Utility filing fee	690
106	310	206	155	Design filing fee	
107	480	207	240	Plant filing fee	
108	690	208	345	Reissue filing fee	
114	150	214	75	Provisional filing fee	

SUBTOTAL (1) ($) 690

2. EXTRA CLAIM FEES

		Extra Claims		Fee from below	Fee Paid
Total Claims	33	-20** = 13	X	18	= 234
Independent Claims	3	- 3** = 0	X		= 0
Multiple Dependent					=

**or number previously paid, if greater; For Reissues, see below

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
103	18	203	9	Claims in excess of 20
102	78	202	39	Independent claims in excess of 3
104	260	204	130	Multiple dependent claim, if not paid
109	78	209	39	** Reissue independent claims over original patent
110	18	210	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($) 234

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
105	130	205	65	Surcharge - late filing fee or oath	
127	50	227	25	Surcharge - late provisional filing fee or cover sheet.	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	
115	110	215	55	Extension for reply within first month	
116	380	216	190	Extension for reply within second month	
117	870	217	435	Extension for reply within third month	
118	1,360	218	680	Extension for reply within fourth month	
128	1,850	228	925	Extension for reply within fifth month	
119	300	219	150	Notice of Appeal	
120	300	220	150	Filing a brief in support of an appeal	
121	260	221	130	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive - unavoidable	
141	1,210	241	605	Petition to revive - unintentional	
142	1,210	242	605	Utility issue fee (or reissue)	
143	430	243	215	Design issue fee	
144	580	244	290	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Petitions related to provisional applications	
126	240	126	240	Submission of Information Disclosure Stmt	
581	40	581	40	Recording each patent assignment per property (times number of properties)	
146	690	246	345	Filing a submission after final rejection (37 CFR § 1.129(a))	
149	690	249	345	For each additional invention to be examined (37 CFR § 1.129(b))	

Other fee (specify) _____

Other fee (specify) _____

* Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($) 0

SUBMITTED BY				Complete (if applicable)	
Name (Print/Type)	Jacob Shuster	Registration No. (Attorney/Agent)	19,660	Telephone	301-227-1834
Signature	Jacob Shuster			Date	9/27/2000

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OPERATING PLAN FOR MACHINERY

STATEMENT OF GOVERNMENT INTEREST

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of U.S. Provisional Application No. 60/217,311 filed 10 July 2000, entitled "Operating Plan for Machinery," incorporated herein by reference.

BACKGROUND OF THE INVENTION

The present invention relates to workflow process management of business organizations, more particularly to methods for managing business and life cycle operations which involve various functions in association with various types of machinery.

Over the last decade the U.S. Navy has actively been pursuing a strategy to reduce the cost of building, maintaining and operating their ships. The strategy included closing and realigning facilities and bases, reducing personnel, reforming the acquisition process and privatization of certain functions. This strategy has impacted the business of Navy Research & Development (R&D) centers such as The Naval Surface Warfare Center, Carderock Division (NSWCCD). The major aspects of this strategy which have affected the business of the Philadelphia site (Ship Systems Engineering Station) of NSWCCD, i.e., NSWCCD-SSES, are: base realignment and closure (BRAC); NAVSEA Downsizing; transferring life cycle management (LCM) to Philadelphia.

BRAC had a major impact on the world of machinery. The Annapolis site of NSWCCD was selected to close in 1995 and its Machinery R&D functions transferred to Philadelphia. For the first time, all key technical functions of the life cycle of Machinery were located at one site. The downsizing of NAVSEA meant that SEA 03 would no longer have the manpower to perform their traditional functions. The Navy would be required to

transfer certain functions to the field. Ultimately, having all the key elements of Machinery located at one location made the decision to transfer life cycle management (LCM) from SEA 03 to Philadelphia straightforward.

A business strategy known as "workflow process re-engineering" has emerged in the business world the last several years. Workflow processes are being rethought and reimplemented by many organizations in order to achiever higher levels of quality, cost-efficiency, production and service. In an era of workforce downsizing, faster customer response and shorter time-to-market, organizations are effectuating workflow process re-engineering in a variety of realms.

The propitious circumstances for effectuating workflow process re-engineering gave rise to the present invention. Historically, the various functions of the business operations of NSWCCD had not been organized into a coherent whole. The transferring of LCM from SEA 03 to Philadelphia afforded NSWCCD-SSES an opportunity to reexamine the business of machinery.

SUMMARY OF THE INVENTION

In view of the foregoing, it is an object of the present invention to provide an integrative methodology for business and life cycle management of machinery.

It is another object of the present invention to provide such an integrative methodology which attains superior results in terms of quality, cost-efficiency, production

and service.

In accordance with many embodiments of the present invention, a method of organizing a workflow management system (such as relating to machinery operations) comprises the steps of: identifying core functions; producing information for each core function; establishing core function units; integrating said information into a coherent, uniform presentation for use by said core function units; and instituting communications among said core function units.

According to some inventive embodiments, a method is provided for defining and executing the flow of management operations (such as pertains to machinery). The method comprises the steps of: establishing plural units, each unit involving a different core function; formulating a manual which prescribes the flow both intrarelationally within each unit and interrelationally between the units; and, enabling communication in and among the units, in furtherance of the flow.

Also in accordance with some embodiments of the present invention, a system for performing workflow management (such as relating to machine operations) comprises: a plurality of core functional units; a manual for utilization by the core functional units, the manual defining the workflow within and between the core functional units; and, means for communication within and between the core functional units.

The present invention was made in response to a need to define and standardize organizational operations. The U.S. Navy's Naval Surface Warfare Center, Carderock Division, "Directorate 90 Operating Plan for Machinery" manual dated 09 July 1999,

appended hereto marked **APPENDIX A**, discloses many aspects of this invention in textual and flow diagrammatic form. Previously, NAVSEA had pulled together numerous knowledgeable people to assist all operations; however, a lack of consistency and integration existed amongst the processes. Because functions were never concisely defined, the inventors, as Directorate 90 personnel, became interested in developing a set of standard procedures outlining these functions.

Basic to the present invention is the recognition that all processes of NSWCCD-SSES can be practiced as subsets of life cycle management (LCM). According to this invention, LCM is divided into external functions and internal functions, and further divided into eleven areas. The "Directorate 90 Operating Plan for Machinery" (OPM) manual dated 09 July 1999, appended hereto marked **APPENDIX A**, is a compilation of separate write-ups in an established, standardized format, and serves as a structured reference for all NSWCCD-SSES operating processes. Each write-up comprises (i) a narrative, (ii) a flowchart and (iii) a detailed procedure.

The inventive "Operating Plan for Machinery" (OPM) is a consequence of a thoughtful reconsideration of the business of machinery. The inventive Life Cycle Management (LCM) is a critical function of the inventive OPM. According to the present invention, a new approach to LCM is taken, wherein several goals for LCM have been identified. These goals include the following: improve system reliability, maintainability and availability; reduce life cycle costs; reduce the time required to introduce new or enhanced capabilities into the fleet.

Prior to the transfer of LCM to NSWCCD-SSES, engineering was split into Life Cycle Engineering, which was done by SEA 03, and In-Service Engineering, which was done by NSWCCD-SSES. This split was not a natural divide, and resulted in redundant capabilities and inefficiencies. The inventors believed that engineering functions should not be divided without communication and interaction therebetween. By inventively combining the engineering functions previously performed by SEA 03 and those performed by NSWCCD-SSES, the Navy will receive significant savings.

The inventors thus sought to consolidate the engineering functions. To this end, the functions of LCM needed to be addressed and the OPM required definition and development. The Code 90 Department Management Team (DMT) realized that the OPM had specific areas that required a documented standardized approach. Therefore the DMT created ten Core Process (CP) teams. These CP teams were separated into two major categories, viz., Technical Core Process (TCP) teams and Internal Core Process (ICP) teams. The Technical Core Process (TCP) teams were: Life Cycle Management; Program/Platform Management; Research and Development; Acquisition Support; Logistics; Test and Evaluation; In-service Engineering. The Internal Core Process (ICP) teams were: Facility Planning; Budget Strategy; Contracting Requirements. These Core Process teams were to define their core area, develop their process flows and identify "links" to others Core areas.

The inventors realized that the mission of the Machinery Directorate of NSWCCD-SSES would require adaptation to support its new role as Life Cycle Managers. In order

to adapt to LCM functions it was critical that the processes, currently performed differently by many people, be defined by one operational plan followed by the entire Directorate. In January 1999, the Directorate Head and Department Heads formed ten teams to begin to describe key process areas. The Technical Core Process (TCP) teams were: Life Cycle Management; Program/Platform Management; Research and Development; Acquisition Support; Logistics; Test and Evaluation; In-service Engineering. The Internal Core Process (ICP) teams were: Facility Planning; Budget Strategy; Contracting Requirements. As the teams began to meet they formulated different ideas of processes in their designated areas. Following the first outbrief in March 1999, the teams were directed to follow a specific format in order to create the Operating Plan for Machinery. Eventually, the Program Management and Platform Management were established as separate core functions, but initially a single team addressed issues encompassed by both core functions.

The format used consisted of three basic parts. First, each team was asked to prepare a flow chart to clearly define their process area. Second, each team was asked to write a narrative which would serve as a comprehensive story of how each specific process is an integral part of our business. Lastly, each team was asked to write a procedure which serves as a technical step-by-step description that is measurable and has the ability to be certified. The combination of these three elements across all teams provided the foundation for the inventive Operating Plan for Machinery, as compiled in the "Directorate 90 Operating Plan for Machinery" (**APPENDIX A**).

The inventive Operating Plan for Machinery describes two key areas which are the

foundation for all process elements of Directorate 90. Part I explains the ability of the Directorate to execute its mission and maintain leadership in Machinery, and is based on the clear definition of eleven critical processes. The Life Cycle Model for Machinery comprises eight process areas which are all linked together at various points. These eight categories describe how Directorate 90 will execute its mission as Life Cycle Managers for Machinery. A key feature of this model is that no one process stands alone, each area is dependent on other areas. This provides clear documents of the complexity of Life Cycle Management while breaking the process down to eight manageable categories, as follows: Life Cycle Management; Acquisition; Research and Development; Test and Evaluation; In-Service-Engineering; Integrated Logistics Support; Program Management; Platform Management. Part II of the Operating Plan comprises the Business Model for Machinery. This model comprises the following three critical business areas: Budget; Facilities; Contracting. Although all eleven areas are linked, each of the eleven process descriptions has a distinct flavor and individual key elements. The eight processes of the invention's Life Cycle Model are more fully described in the detailed description hereinbelow.

An alternative approach would involve development of a book consisting of just a narrative; however, such a book would not contain an appropriately detailed representation of the process and policy. Neither this nor other alternative approaches which have been considered offer a comprehensive explanation of the process and policy, as does the Operating Plan for Machinery in accordance with the present invention.

As previously emphasized, the present invention takes a new and improved approach

to life cycle management. With the engineering management functions thus inventively consolidated, the actual purpose of the inventive Life Cycle Mangagement becomes manifest: The inventive Life Cycle Management binds the Technical Core Process (TCP) functions together. Each of the TCP functions is an independent entity which is both autonomous and interrelated with every other TCP function. The inventive life cycle management system synthesizes the TCP functions into a coherent whole. Every TCP function interacts with every other TCP function. The TCPs support and are supported by each other. The function of the overall LCM is to ensure that the interaction occurs. The LCM process makes sure that one or more TCP functions do not diverge or split away or develop independently.

For instance, LCM makes sure that, if the Research and Development (R & D) TCP function develops a widget, that widget does not merely "sit on a shelf" in the event that someone needs it. If one of the TCPs is not "linked" to the others or funded properly, then the Life Cycle is weakened. As each of the TCPs and ICPs develop their process flow charts they will identify the "links". It is an essential function of the LCM to manage these links and make sure they happen. Thus, the LCM will be divided into major technical functional areas, as described herein and in the appendices. Each LCM division will be responsible for making sure that all the TCPs for their technical functional area are operating properly. All of the TCPs and ICPs are vital parts of the inventive "Operating Plan for Machinery." The processes inventively developed will perhaps define the way NSWCCD does business for the next decade and possibly beyond. The inventive LCM is

the process that will bind together all these key business elements of NSWCCD.

At the time that NSWCCD took over the role of Life Cycle Management (LCM) from CO3, the definition, procedure, process and policy were not available to define the role of LCM. An important feature of the inventive OPM plan is the definition of two key parts, groups or categories, viz., the Life Cycle Model for Machinery and the Business Model for Machinery. The Life Cycle Model for Machinery is broken into eight functional subparts, while the Business Model for Machinery is broken into three functional subparts. The eight functional subparts of the Life Cycle Model for Machinery are the following: Life Cycle Management; Acquisition; Research and Development; Test and Evaluation; In-Service Engineering; Integrated Logistics Support; Program Management; Platform Management. The three functional subparts of the Business Model for Machinery are the following: Facility Planning; Budget Strategy; Contracting Requirements. The present invention thus features: the synthesis of all "technical" functions (e.g., per the "Life Cycle Mode for Machinery"); or, the synthesis of all "business" functions (e.g., per the "Business Model for Machinery") of managing machinery; or, the synthesis of all "technical" functions (e.g., per the "Life Cycle Mode for Machinery") and "business" functions (e.g., per the "Business Model for Machinery").

The inventive Operating Plan for Machinery has many advantages. The conglomeration of all of these subparts defines NSWCCD's business process; to the best of the inventors' knowledge, this process has never been defined previously by any organization, public or private. People who are involved with the operations of NSWC will

be able to clearly see what's expected; customers will be able to gain full understanding of NSWCCD's Directorate 90's role and functions in LCM. Following the standardized procedure and process, Life Cycle products can be clearly defined and better tracked. Core functions of LCM will also be better defined and tracked, as will the proposals logged against them. The inventive OPM better illustrates links between individual processes to one another; without these links, the Life Cycle Model is weakened. Government studies for public functions will have a clearer understanding of NSWCCD's functions.

The present invention's unified, comprehensive and interactive approach to life cycle and business management is superior to one which would entail distinct groups which function autonomously and noninteractively. According to such a plan characterized by disconnectiveness, NSWCCD would proceed essentially with no overall process and allow different branches to create their own individual processes. The lack of nexuses among the various processes and the incohesiveness thereof would render the overall scheme relatively ineffective.

Other objects, advantages and features of this invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE APPENDICES

The following appendices are hereby made a part of this disclosure:

Attached hereto collectively marked **APPENDIX A** and incorporated herein by reference is a copy of the aforementioned manual entitled "Directorate 90 Operating Plan for Machinery," which was issued internally within Directorate 90 of the Naval Surface Warfare Center, Carderock Division as a first draft on July 9, 1999. This appended manual **(APPENDIX A)** contains 82 pages.

Attached hereto collectively marked **APPENDIX B** and incorporated herein by reference are ten flow diagrams, marked "FLOW CHART B-1," "FLOW CHART B-2," FLOW CHART B-3," "FLOW CHART B-4a," "FLOW CHART B-4b," FLOW CHART B-5a," "FLOW CHART B-5b," "FLOW CHART B-6," FLOW CHART B-7" and "FLOW CHART B-8." Each flow diagram corresponds to one of the eight external core function units or sections (viz., (1) Life Cycle Management, (2) Acquisition, (3) Research and Development, (4) Test and Evaluation, (5) In-Service Engineering, (6) Integrated Logistics Support, (7) Program Management and (8) Platform Management, respectively) of the "Life Cycle Model" (entailing external core functions) in accordance with the present invention. FLOW CHART B-4a and FLOW CHART B-4b both correspond to Test and Evaluation. FLOW CHART B-5a and FLOW CHART B-5b both correspond to In-Service Engineering. The flow diagrams contained in **APPENDIX B** are copies of printouts some of which are dated 03 May 2000, and are revised versions of equivalent or comparable flow diagrams contained in **APPENDIX A**. **APPENDIX B** contains 16 pages.

Attached hereto collectively marked **APPENDIX C** and incorporated herein by reference are three flow diagrams, marked "FLOW CHART C-1," "FLOW CHART C-2"

and FLOW CHART C-3." Each flow diagram corresponds to one of the three internal core function units or sections (viz., (1) Facility Planning, (2) Contracting Requirements and (3) Budget Strategy, respectively) of the "Business Cycle Model" (entailing internal core functions) in accordance with the present invention. The flow diagrams contained in **APPENDIX C** are copies of printouts dated 04 May 2000, and are revised versions of equivalent or comparable flow diagrams contained in **APPENDIX A**. **APPENDIX C** contains 4 pages.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the present invention may be clearly understood, it will now be described, by way of example, with reference to the accompanying drawings, wherein like numbers indicate the same or similar components, and wherein:

FIG. 1A and **FIG. 1B** together constitute a flow diagram illustrative of the establishment of an inventive operating plan, which can be considered to be embodied as a "Life Cycle Model" (comprising "external" core function units) and/or a "Business Cycle Model" (comprising "internal" core function units), in accordance with the present invention.

FIG. 2 is a block diagram illustrating an inventive operating plan embodied as a "Life Cycle Model" (comprising "external" core function units), in accordance with the present invention.

FIG. 3 is a block diagram illustrating an inventive operating plan embodied as a "Business Cycle Model" (comprising "internal" core function units), in accordance with the present invention.

FIG. 4 is a block diagram illustrating an inventive operating plan embodied as the combination of a "Life Cycle Model" (comprising "external" core function units) and a "Business Cycle Model" (comprising "internal" core function units), in accordance with the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the figures, and especially to **FIG. 1A** and **FIG. 1B**, the first stage in formulating an inventive organizational scheme for managing machinery throughout their life cycles involves the identification of core functions. According to the present invention's Operating Plan for Machinery, the core functions are divided into two categories, viz., "external" functions and "internal" functions. The external core functions are alternatively referred to as "technical" core functions, or "technical core processes" ("TCPs"), or "life cycle management" (LCM) functions. The external core functions comprise eight external core functions. The internal core functions are alternatively referred to as "business cycle management" (BCM) functions, "business" functions or "internal core processes" ("ICPs"). The internal core functions comprise three internal core functions.

Each core function requires production and presentation of information of at least three kinds, viz., substantive information, procedural information and graphic information. The substantive information, primarily textual, is "narrative" description directed toward an understanding of background, policies, purposes, rationales, objectives, scope, authorities, responsibilities, definitions, references, etc. The procedural information, also primarily textual, is generally a more structured format directed toward an understanding of procedures and processes, e.g., in terms of sequence of operations, and in terms of prescribing duties to be performed under various circumstances. The graphic information includes flow charts (flow diagrams) which detail not only the intra-function processes but also the inter-function processes; that is, the flow charts corresponding to each core function describe procedures autonomous to such core function as well as procedures interrelated with one or more other core functions.

To this end, the Navy established ten core function teams. Seven core function teams corresponded to the external core functions; these teams were as follows: Life Cycle Management; Program/Platform Management; Research and Development; Acquisition Support; Logistics; Test and Evaluation; In-service Engineering. Three core function teams corresponded to the internal core functions; these teams were as follows: Facility Planning; Budget Strategy; Contracting Requirements. All of the core function teams were directed to define their respective core functions, develop their respective process flows, and identify their respective nexuses to other core functions. Each core function team presentation was to follow the prescribed "narrative," "procedure" and "flow chart" demarcations.

It is noted that a single core function team covered the external core function entitled "Program/Platform Management"; however, the Navy subsequently decided that the core function designated "program/platform management" could be better deemed to represent two core functions. Hence, the Navy separated "Program/Platform Management" into two core functional units, viz., "Program Management" and "Platform Management." This discrepancy (between the core functional teams and the core functional units ultimately established) exemplifies how inventive practice should be characterized by a degree of flexibility. In other words, frequently in inventive practice, the organizational structure in terms of core functional units may not crystallize until some time during or after the period in which core functions are identified and data produced in relation to each core function. Generally speaking, the established core functional units will bear some relation to the previously identified core functions; typically, the former will be commensurate with or at least roughly correspond with the latter.

All of the informational presentations pertaining to the respective core functions are gathered, assimilated and synthesized into a manual **99**, such as shown in **FIG. 2** through **FIG. 4**, for use by each of the core functional units. The "Directorate 90 Operating Plan for Machinery" (OPM) manual dated 09 July 1999, **APPENDIX A**, is a synthesis, in writing, of the separate presentations into an integral reference guide for all of the core functional units. The Navy also rendered this manual in CD-ROM form. As shown in **APPENDIX A**, The manual's "Table of Contents" includes three main headings, viz., "I. Introduction," "II. Life Cycle Model for Machinery" and "III. Business Model for

Machinery." The "Life Cycle Model for Machinery" represents the external core functions. The "Business Model for Machinery" represents the internal core functions. In the "Table of Contents," the "Life Cycle Model for Machinery" and the "Business Model for Machinery" each contain the same sub-headings, viz., "A. Flowcharts," "B. Narratives" and "C. Procedures."

It is pointed out that the order of the inventive steps illustrated in **FIG. 1A** and **FIG. 1B** is not critical. Nevertheless, inventive practice will generally prescribe the identification of core functions as the initial step in the inventive methodology.

Still referring to **FIG. 1A** and **FIG. 1B** and also referring to **FIG. 2**, **FIG. 3** and **FIG. 4**, eight external core function units and three internal core function units were formed. As shown in **FIG. 2**, the eight external core function units were established in general correspondence with the seven external core functions originally identified. Similarly, as shown in **FIG. 3**, the three internal core function units were established in general correspondence with the three internal core functions originally identified.

Particularly with reference to **FIG. 2**, the eight external core function units are as follows: Life Cycle Management **1**; Acquisition **2**; Research and Development **3**; Test and Evaluation **4**; In-service Engineering **5**; Integrated Logistic Support **6**; Program Management **7**; Platform Management **8**. Each core function unit has been provided, and has at its disposal, a hard copy of manual **99**. Other forms or renderings of manual **99** (e.g., a CD-ROM version, or a computer intranet database) can also be made available to every external core function unit. Communications system **69**, which links every external

core functional unit to each other, includes telephone means **61**, facsimile transmission means **62**, computer means **63** and paper correspondence means **64**. Computer means **63** preferably includes electronic mail means and can also include computer intranet means. Paper correspondence means **64** preferably includes a mailing system for transmitting documents from on core function unit to another. Each external core function unit also possesses similar communications capabilities within such unit. In other words, in inventive practice, communications system **69** would typically presuppose intracommunications means within each external core function unit as well as intercommunications means between/among the external core function units.

Particularly with reference to **FIG. 3**, the three internal core function units are as follows: Facilities **11**; Contracts **12**; Budget **13**. The core function unit designation "facilities" **11** is basically synonymous with the core function designation "facility planning," The core function unit designation "contracts" **12** is basically synonymous with the core function designation "contracting requirements." The core function unit designation "budget" **13** is basically synonymous with the core function designation "budget strategy." As is the case with the external core function units, each internal core function unit has been provided, and has at its disposal, a hard copy of manual **99**. Other forms or renderings of manual **99** (e.g., a CD-ROM version, or a computer intranet database) can also be made available to every internal core function unit. Communications system **69**, which links every external core functional unit to each other, includes telephone means **61**, facsimile transmission means **62**, computer means **63** and paper correspondence means **64**.

Computer means **63** preferably includes electronic mail ("e-mail") means and can also include computer intranet means. Paper correspondence means **64** preferably includes a mailing system for transmitting documents from on core function unit to another. Each internal core function unit also possesses similar communications capabilities within such unit. In other words, in inventive practice, communications system **69** would typically presuppose intracommunications means within each internal core function unit as well as intercommunications means between/among the internal core function units.

In accordance with the present invention, the internal core function units (core function units **1**, **2**, **3**, **4**, **5**, **6**, **7** and **8**) and the external core function units (core function units **11**, **12** and **13**) can be consolidated into an integral life cycle/business methodology, such as shown in **FIG. 4**. As shown in **FIG. 4**, every core function unit, external and internal, is involved in communications system **69** and has its own reproduction of the same manual **99** associated therewith. In inventive practice, communications system **69** would typically presuppose intracommunications means within each internal or external core function unit as well as intercommunications means between/among the internal and external core function units. Alternatively, stand-alone inventive operating plans can comprise external core function units only (such as shown in **FIG. 2**) or internal core function units only (such as shown in **FIG. 3**).

The same manual **99** is used by every core function unit and keeps the core function units "on the same page. "Manual **99** is not an "etched-in-granite" document. Rather, manual **99** is an ever-changing document representative of a dynamic, ongoing process.

Preferably, periodically updated editions of manual **99** will be part and parcel of the inventive business plan. Preferred inventive practice prescribes the institution of a timetable (e.g., every six months) for periodic submissions by core functional units of their corresponding updated sections of manual **99**. Ideally, the "management workflow channels" would continually be enhanced, e.g., added to, subtracted from or otherwise changed.

Fundamental to the inventive life cycle management system is the continuous pursuit of improvement -- in particular, the constant endeavor to find and secure "connections" between one's own core functional unit and one or more other core functional units. The cohesiveness of the inventive business plan is founded especially on two linchpins, namely, communications and connections. "Communicate" and "connect" are two of the the inventive watchwords. As depicted in **FIG. 2** through **FIG. 4**, communications system **69** in various ways advances communication among the core function units, thereby facilitating operation of the inventive business plan, and also thereby advancing the cohesiveness thereof as its participants continually strive for new or better ways to connect across core function unit demarcations. The changes in terms of "connectiveness" are continually manifested in manual **99**, in the procedures therein and especially in the flow diagrams therein.

As illustrated in **FIG. 2** and **FIG. 4**, each of the external core function units (also referred to as "technical core processes," or "TCPs") is shown as an octagonal block. The present invention's life cycle management (LCM) is a force (envisionable as an outer ring

in **FIG. 2**) which binds the external core function units and prevents their separation. Similarly, as illustrated in **FIG. 3** and **FIG. 4**, each of the internal core function units (also referred to as "internal core processes," or "ICPs") is shown as a triangular block. The present invention's business cycle management (BCM) is a force (envisionable as an outer ring in **FIG. 3**) which binds the internal core function units and prevents their separation. As depicted in **FIG. 4**, the external core units and the internal core units can be combined into a unitary business methodology wherein the invention's life and business cycle management (LCM and BCM) is a force (envisionable as an outer ring in **FIG. 4**) which binds the external core functions and the internal core function units and prevents their separation.

The core function units all overlap one another in a functional sense. That is, all of the core function units must interact with and support each other. The inventive life cycle managment ensures that the interaction among the core function units occurs, and that none of the core function units splits away and develops independently. For instance, the inventive life and business cycle management would not permit a situation wherein a product which is developed by the external core function unit denoted "Research and Development 3" is needed by others, and yet the product sits on a shelf unbenownst to others. If one of the core function units is not "linked" to the others or funded properly, then the inventive life and business cycle is weakened. As each of the external core function units (TCPs) and internal core function units (ICPs) develop their process flow charts, they will identify the "links". It is an essential overall function of the inventive life

and business cycle management to manage these links and make sure they happen.

Each of the external core function units is considered in turn hereinbelow.

1. Life Cycle Management

a. General Description

Life Cycle Management (LCM) is the process of managing all aspects of machinery to ensure ships continue to perform their mission. The aspect of machinery includes the entire life cycle from conception through implementation. The Life Cycle Manager is responsible for maintaining metrics to improving system reliability, maintainability and availability, reducing total ownership costs, reducing cycle time for introducing new or enhanced capabilities into the fleet, and further the integration of machinery into the Battle Force and Battle Group.

b. Existing Condition

Previously the responsibility of LCM for machinery was managed at NAVSEA while many of the support functions were located at Philadelphia. Due to BRAC and NAVSEA downsizing the LCM functions for machinery are currently being transferred to NSWCCD-SSES. This new responsibility required clear definition.

c. Faults of Existing Condition

A variety of shortcomings existed in the processes of LCM. Each LCM performed independently and differently from one another. There existed no consistency of process between LCMs. It was not always evident who the point-of-contact (POC) for a particular LCM was. In addition, while LCM was located at NAVSEA and ISE at NSWCCD, there existed: redundant capabilities and inefficiencies; lack of continuity of communication between organizations; cost overlaps between LCM and ISE.

d. Key Features and Improvements

The Life Cycle Model was designed as the solution to previous deficiencies in Life Cycle Management of machinery. With all key elements of LCM combined, it was evident a process needed to be defined. It was determined that LCM is the core function which binds all technical functional areas together including Program Management, Platform Management, Research & Development, Acquisition, Integrated Logistics Support, Test & Evaluation and In-Service Engineering. The key to the inventive improvement is the combination of developing the process for each function, documenting those processes and identifying the links between each process. The documentation of the complete process is present in the form of narratives, flow charts, and procedures which are included in **APPENDIX A**.

LCM responsibilities moved under the existing technical authorities who also posses the responsibility of In-Service Engineering (ISE). LCM responsibilities have been sub-divided among the following twenty technical authorities: (1) Life Support

Systems/AC&R/HVAC and Air Systems; (2) Main & Auxiliary Boiler Systems and Catapult Accumulators; (3) Pumps, Fluid Systems & Auxiliary Steam Turbines; (4) Steam System Controls; (5) Diesel Engines; (6) Non - Nuclear Power Transmission; (7) Electric Power Systems; (8) Gas Turbine Systems; (9) Logistics Data; (10) Sensors; (11) Machinery Controls; (12) CBM Systems; (13) Submarine Antennas; (14) Integrated Bridge & Machinery Interface Systems; (15) Networking Systems for Machinery; (16) Ship handling & Deck Machinery; (17) Integrated Cargo/Weapons Handling Systems; (18) Hull Outfitting & Closures; (19) Ship & Submarine Steering, Diving, Maneuvering & Hydraulics; (20) Habitability.

A process plan was developed for LCM under each of the technical authority. Each LCM has been empowered to perform the following:

(i) Prepare and execute a system level LCM Master Plan. The plan identifies the next five to seven year life cycle management requirements at the system level including prioritized fleet problems and associated solutions (i.e. Gas Turbine LCM Master Plan). The plan also specifies the total workload/requirements for all applicable ship classes (cross-platform plan) including R&D, ISE, SSA, T&E, LCM, Ship Acquisition, Program Management and installation/backfits.

(ii) Continuously monitor and track ISE system performance data (metrics). Compare goals vice actual performance data.

(iii) Perform as the system expert, maintaining a knowledge base of all aspects of the system.

(iv) Interface with the fleet on a regular basis to discuss issues, concerns and potential changes to hardware, software, maintenance, logistics and training.

(v) Submit system program planning information and long-term funding requirements throughout the appropriate Program/Platform office.

(vi) Ensure each LCM is linked to all associated LCM for system interoperability to guarantee a fully integrated ship.

e. Advantages

With the defined process, LCM was assured to be performed consistently under each technical authority. Each associated step within the process is now weighted similarly across technical authorities.

LCM linking each TCPs ensures all must interact and support each other. Linking also, guarantees all areas are funded properly.

Reduction of Life Cycle costs due to overlap of functions within the technical authorities responsible for both LCM and ISE. In addition, the current streamed lines processes are expected to reduce LCM costs.

The documented procedures of LCM contains inherit advantages. The documented process lends itself to improvement as the process evolves. The documented process serves to accommodate auditing. The procedures are able to be certified which contribute to a competitive US Naval and commercial advantage.

2. Acquisition

a. General Description

Acquisition engineering serves to support HM&E systems by providing quality products at reasonable prices in a timely manner. Within the acquisition process, several phases occur to develop and execute the acquisition program applicable to its respective user. It is the role of the various program offices in acquisition and logistics to discover methods to improve the overall efforts of these operations while maintaining and increasing efficiency.

b. Existing Condition

NSWCCD-SSES' acquisition program has always been actively engaged at all stages of the new ship class acquisition process. NSWC representatives have been stationed at various program offices carrying out the functions specific to that phase of the acquisition cycle. Representatives initiate communication between necessary parties and dictate all steps needed to move the process onto the next phase until all milestones are reached and completed.

c. Faults of Existing Conditions

While the overall definition of the acquisition process is clearly understood, the roles, responsibilities, and functions within each of its phases were not adequately defined.

There is no standardized procedure for each of the acquisition phases that would allow the program offices to feel any sense of cohesion. There are no listed formats as to the proper way to receive, record, and send data between various offices. This lack of consistency results in delays that could otherwise be avoided in the acquisition process.

d. Key Features and Improvements

The implementation of the Operating Plan for Machinery (OPM) would accommodate the acquisition program's need to integrate different program offices. Data among all the offices would be standardized allowing for the synchronization of data calls. An important link between acquisition and the new program management would also be demonstrated in the OPM. The inclusion of this link cites the acquisition program's incorporation into NSWCCD-SSES' overall operations and not just as a separate function unto itself. Communications among program offices and other branches of the Life Cycle Model for Machinery would not be strained. All these features enable the acquisition process at NSWCCD-SSES to function smoothly and at a more efficient level.

e. Advantages

The OPM will allow the program to follow a detailed process, assist communications, and standardize the business procedures of the organization's structure by doing the following: provide standard procedures for a variety of representatives in a multitude of locations; provide our insight to various acquisition programs; allow the life

cycle managers to execute their future plans on future ship platforms.

3. Research and Development

a. General Description

The product of Research and Development (R&D) is an operational capability. Hardware is but one subsystem of operational capability. The elements of the total system required to provide an operational capability include equipment, people, facilities, material and information.

Equipment includes system hardware plus equipment (trainers, support equipment, etc.) required for its effective utilization and support.

People include trained crews and maintenance personnel plus the support system required for their continuing development and the training of their replacements.

Material includes consumables, spares, etc.

Information includes technical, computer programs, maintenance data, operating tactics, maintenance procedures, etc.

The function of R&D in the development of operational capabilities is the production of the information required to achieve such capabilities. R&D is a multistage information generation and conversion process characterized by the integration and conversion of information within stages and information flow coupling between stages.

b. Existing Condition

Although the Navy itself has a very detailed procedure for the research and development of technological concepts for shipboard systems, it is not define where or how NSWCCD-SSES fits in to their overall process. NSWCCD-SSES does some research and development, but there is no process or explanation as to how R&D attempts to meet the Navy's need to apply developmental and transitional technology to existing ship systems.

c. Faults of Existing Condition

No standard process exists for the operations of research and development at NSWCCD-SSES. While New Ship Acquisition programs are based on a fairly defined process, R&D is lost in the big picture and needed a more detailed procedure of its own phases.

d. Key Features and Improvements

The OPM simply analyzes and defines all the key elements involved in R&D operations. Everything from initial concepts to execution of technology implementation and sponsor funding is explained in the form of procedures. Responsibilities and the reasons why functions are performed are also detailed.

e. Advantages

The goals of R&D are more thoroughly outlined via flowcharts and narratives. These flowcharts also incorporate functions of other NSWCCD-SSES programs into the R&D process. Upon examination, the interdependent business operations of the entire organization are easier to understand.

4. Test and Evaluation

a. General Description

The functions of the Test and Evaluation (T&E) process at NSWCCD-SSES are designated for both shipboard and land-based testing. Their objectives include identifying what is to be proved by testing and what is to be needed to perform testing while maintaining all standards and providing the required documentation. They are responsible for assessing the ship area where the equipment will be installed or the land test facility that will support the needs of the testing. Modifications are made to the structural configurations of test areas if necessary. In developing and producing design packages to modify existing sites, reviews of plans must be made in accordance with outside programs, generating a sequence of links throughout NSWCCD-SSES's operations.

b. Existing Condition

Prior to the inventive OPM, no distinction was made between the procedures of

land-based and shipboard testing. There was somewhat of a process for land-based testing, and a process existed for shipboard industrial work, but none for shipboard testing. Because of that, safety and environmental conditions were never taken into account.

c. Faults of Existing Condition

Without a process distinguishing the two kinds of testing, there was no way to document that T&E was not in violation of safety or environmental regulations.

d. Key Features and Improvements

A main feature of the inventive OPM is that land-based testing and shipboard testing is broken down into two separate processes. This allows for T&E to follow safety conditions respective to their testing.

e. Advantages

Test sites are now safer because environmental conditions are considered. The proper NAVSEA tech specs for land-based and shipboard blue collar are followed. The differentiation made between land-based and shipboard testing enables T&E to actively ensure that its following all environmental regulations and assisting in the safety of its workers.

5. In-Service Engineering

a. General Description

The Life Cycle Model for Machinery integrates all aspects of machinery engineering. A critical role for NSWCCD-SSES is to provide engineering support throughout the life cycle of HM&E equipment and systems. This effort involves an intense engineering effort throughout the shipboard life of the machinery. This effort is broken down into four distinct categories of data analysis/management, maintenance engineering, design engineering, and installation engineering. Throughout these procedures, it is the continuing task of ISE to impact and maintain performance, reliability, availability, logistic support, safety, and lifestyle cost in all its operations.

b. Existing Condition

NSWCCD-SSES has always been tasked in-service engineering (ISE) machinery modifications. ISE is critical in monitoring machinery in ships. Because of this long-term commitment to shipboard maintainability, there is a strong, focused understanding of machinery. Now, ISE has been incorporated as a subset of Life Cycle Management, where the scope has been widened but not clearly defined. Whereas ISE was formerly expected to understand the present condition of equipment and systems, they are going to be actively involved in the technological future of those systems. The modifications they perform today must be done with the vision of what's to come.

c. Faults of Existing Condition

ISE should have always been integrated with Life Cycle Management because its former situation did not allow it to improve or develop. Under past conditions, people were pigeonholed into equipment specialties instead of becoming acquainted with whole systems. While individuals may have become experts at their respective projects, their focuses became too narrow. The manual will ensure ISE engineers define standard metrics affecting machinery.

d. Key Features and Improvements

The OPM helps to outline and illustrate a few significant points that are not otherwise addressed collectively in a reference format. These points include engineering forms different than ISE that will be integrated into Life Cycle Management, optimizing more resources of knowledge. ISE will be tied into all aspects of machinery from concept to final equipment disposition. The OPM forces people to look at the entire life cycle of a piece of machinery, including future requirements. The manual will also standardize engineering procedures for both equipment and systems. In addition to that, the manual focuses on ISE as a cooperation of four separate engineering entities: data analysis/management, design engineering, installation engineering, and maintenance engineering. Just as the Life Cycle Model for Machinery emphasizes that the business at NSWCCD-SSES is an interdependency of 8 different programs, ISE is viewed as a similar

interdependency of those four engineering functions.

e. Advantages

NSWCCD-SSES constantly strives to find avenues of improvement within its operations. The approach taken by the inventive OPM addresses ISE's need to pool and organize information together to serve as an even greater source for the modification of shipboard systems. The OPM does the following to improve ISE's service to its users: forces ISE people to collect metrics; allows/helps engineers to work together; brings installation engineering knowledge of machinery into data analysis/management, maintenance engineering, and design engineering, and vice versa.

Recognizing the common denominator each process shares with one another helps sponsors and users have a better understanding of how modifications to shipboard systems are worked through.

6. Integrated Logistics Support

a. General Description

Integrated Logistics Support is the process on developing, maintaining, improving, managing and delivering technical documentation for all Hull, Mechanical and Electrical (HM&E) equipment and systems in the Navy. NSWC is the Navy's source and repository

of fully integrated logistics products for HM&E systems. These products are delivered to the fleet and other customers in a fully automated and interactive environment. The products include: Life Cycle Cost Analysis (LCC); Reliability, Maintainability & Availability (R,M & A); Planned Maintenance Systems (PMS); Surface Ship Maintenance Effectiveness Review (SURFMER); Operational Sequencing System (OSS); Technical Manual (TM); Navy Training System Plans; Electronic Training Media; Allowance Support Documentation; Provisioning Technical Documentation.

b. Existing Condition

Previously, the process of updating logistics elements across all products was not defined. A logistics change would be identified from a variety of sources. It could be initiated from T&E, ISE, Acquisition, Program Management, Platform Management, or R&E due to feedbacks, alterations, advisory or ECP. Each of these areas used an array of personnel to interface with an array of logistics personnel. In addition, a variety of proprietary systems and tools were used to produce the various logistics products in an assortment of formats.

c. Faults of Existing Condition

The logistics department had identified many problems with the previous method of business. There was no full proof method that all other logistics products impacted were updated. Cost of logistics to the customer varied depending on the avenue entering the

NSWCCD and the Logistics Department. There existed no consistency of interaction between core technical areas and each of the logistics area. The cost of funding the various proprietary tools was exorbitant for each logistics element and redundant across logistics areas. The end products produced were inconsistent among logistics products causing confusion to the end users.

d. Key Features and Improvements

Improvements can be unfolded into two key areas. First, the Integrated Logistics Support Process has been defined and linked to all technical core areas and infused within the Life Cycle Model. The documentation of this process is present in the form of narratives, flow charts, and procedures which are included as exhibit (A) under Integrated Logistics support. Second, the use of non-proprietary automated logistics tools with non-proprietary integrated logistics product formats have recently matured to a fully functional state.

The links to and from all the technical core areas are the bond which tie and hold the logistics element to all other elements. Within the Logistics Support Process the Logistics Product Advocate (LPA) arrangement has been developed to promote the linked processes. An LPA position was developed for each of the existing departments. Interface roles were initially defined and constantly redefined to correct all deficient conditions. Presently roles include the following:

(i) LPA liaisons with the Logistic Department, ISEA, and OEM to ensure

lines of communication are open.

(ii) LPA must meet with the team involved in each task to review the ILS checklist determining logistics impact. The Logistics Department will provide a complete history of each product to aid in the full understanding of impact.

(iii) Estimates will be obtained for completing the task. All related deficient logistic data will be researched in an effort to clear all deficiencies.

(iv) The LPA will provide a single NSWC estimate to the originator.

(v) When the task is funded, the LPA will provide funding to all groups involved. If for any reason the task is unfunded, it will be held pending for future consideration.

(vi) When the technical information is developed by the ISEA, the LPA will provide the information to the Logistics Department.

(vii) The Logistics Department will follow their documented procedures to produce and distribute the final product to all appropriate customers.

From its inception, the logistics department has continually strived to improve the creation, editing, managing, and production of logistics products by taking advantage of Information Technology. Until recently, all logistics documents had always been in one proprietary format or another. This fact resulted in total dependence on specific contractors for customized tools to edit documents and to manage the database, and also to produce print packages and CD-ROMs. Recently all logistics documents have been converted to

an open format. This open format allowed for the selection of competitive support tools. In addition, all logistics elements can and do use the same support tools over the life of the products. Finally, the ILS department has developed mature logistic ship configuration support system. These systems ensure accurate logistics products are produced for all areas within each ship in the fleet.

e. Advantages

The Integrated logistics process will always be linked to all other Technical Core Processes lending to a strong bond and continuous cohesion.

All logistics elements impacted will be updated regardless of source initiation task.

Cost of logistics to the customer will be consistent for all customers against all logistics products.

The LPA acting as the "One Stop Shopping" POC for any logistics product eliminates customer confusion which lends to ease of doing business with ILS.

Cost to for Logistics support tools has decreased significantly. Logistics automated support tools are acquired competitively lending to functionally strong tools at competitive costs. Moreover, use of the same tools across for each logistics elements has lowered tool costs within the ILS Department. The savings are realized by the use of a consolidated support staff (which has lower support staff costs), and by the use of shared concurrent software licenses (which has lower license costs).

Due to the competitive tool environment, increased flexibility was realized which

is needed to respond quickly to unexpected events which are inherent demands within the Navy.

Due to the same tools used for each logistics production product, the end products are produced similarly. This works toward minimization of customer confusion.

The ILS department can ensure each ship has accurate logistics products by using reliable configurations systems.

7. Program Management

a. General Description

Program management is the process of working with and through other people and using appropriate resources to meet the specified program requirements within cost, on schedule, and at a performance level that satisfies the customer/sponsor. In executing program management, the Program Manager must effectively accomplish a number of management functions during the program's life cycle. These management functions include initiating, planning, executing, managing and closing. Program management must first take into account diverse interests and points of view. Second, it facilitates tailoring the management system and techniques to the uniqueness of the program. Third, it represents integration of a complex system of differing but related functional discipline areas that must work together to achieve program goals.

b. Existing Condition

Program management is involved with everything from new ship acquisitions, alterations, the enabling of technology, research anddevelopment, and large scale test facilities. Each program formerly followed its own process is those given areas in order to accomplish their individual tasks but in coordination to the organization. The chief principles of program management are to initiate, manage, and plan.

c. Faults of Existing Condition

The interface between program management and the rest of the organization was lacking. What made something a program was never defined, and the evaluation of whether or not something should be considered a program was never defined. There also appeared to be no consistent way to gather and develop information necessary of a proposal for a program. Also, status reporting to program sponsors, as opposed to platform sponsors, was never detailed.

d. Key Features and Improvements

The responsibilities and functions of program management are more accurately described in the inventive OPM. Not only that, but the OPM explains how the functions of a program manager correspond with outside departments and programs.

e. Advantages

The scope of program management is great, but the OPM helps to clearly examine the components necessary to support all aspects ofNSWCCD-SSES in an efficient manner. The critical elements ofprogram managing are extensively evaluated, allowing for proper execution of the process.

8. Platform Management

a. General Description

Platform Management is the process of interfacing our engineering and support codes with our platform sponsors. Their mission is to use appropriate resources to meet the specified requirements within cost, on schedule, and at a performance level that satisfies our customers. Three critical roles of the Platform Managers are to gather proposals, track products, and provide information.

b. Existing Condition

There are two platform managements: one that is engaged in surface combatant operations, and another involved with all other platforms. A platform is a class of ships or group of similar classes of ships. It is the responsibility of platform management to manage money, proposals, feedback, and to interface with the platform sponsor for the various platforms. Each platform management, and platform themselves, operated under its own process autonomously.

c. Faults of Existing Condition

Because each platform managed itself, there was no consistent type of proposals, way to track finances, or follow trending. Sponsors were then unable to follow an unobstructed path of work done from one ship to the next and how their money was being handled because none of it was done in the same way for each platform.

d. Key Features and Improvements

The inventive OPM standardizes all platform management functions. This allows for life cycle functions to stretch across all platform areas and sponsors to have the same vantage-point for all business they conduct with NSWCCD-SSES. The path of money can be better followed through the operation structure.

e. Advantages

Although all groups interface with one another, program and platform management are the central nodes to interface with because of their direct interface with sponsors. This system is an effective way to balance finances to products, ensuring sponsors that their finances are being properly used in an efficient way thus gaining their confidence in the organization.

Other embodiments of this invention will be apparent to those skilled in the art from

a consideration of this specification or practice of the invention disclosed herein. Various omissions, modifications and changes to the principles described may be made by one skilled in the art without departing from the true scope and spirit of the invention which is indicated by the following claims.

What is claimed is:

1. A method of organizing a workflow management system, said method comprising:

identifying core functions;

producing information for each core function;

establishing core function units;

integrating said information into a coherent uniform presentation for use by said core function units; and

instituting communications among said core function units.

2. A method according to claim 1, wherein said identifying core functions includes identifying external core functions selected from the group consisting of life cycle management, acquisition, research and development, test and evaluation, in-service engineering, integrated logistic support, program management and platform management.

3. A method according to claim 1, wherein said identified core functions are external core functions including life cycle management, acquisition, research and development, test and evaluation, in-service engineering, integrated logistic support, program management and platform management.

4. A method according to claim 1, wherein said identifying core functions includes identifying internal core functions selected from the group consisting of facility planning, budget strategy and contracting requirements.

5. A method according to claim 1, wherein said identifying core functions includes identifying internal core functions selected from the group consisting of facilities, budget and contracts.

6. A method according to claim 1, wherein said identified core functions are external core functions including facilities, budget and contracts.

7. A method according to claim 1, wherein said identifying core functions includes dividing said core functions into external core functions and internal core functions.

8. A method according to claim 7, wherein said identified external core functions are selected from the group consisting of life cycle management, acquisition, research and development, test and evaluation, in-service engineering, integrated logistic support, program management and platform management.

9. A method according to claim 7, wherein said identified internal core functions are selected from the group consisting of facilities, budget and contracts.

10. A method according to claim 1, wherein said producing information for each core function includes producing narrative description, procedural description and flow diagrammatic description for each core function.

11. A method according to claim 1, wherein said integrating said information includes issuing a manual, wherein said manual includes narrative description, procedural description and flow diagrammatic description for each core function.

12. A method according to claim 1, wherein said establishing core function units includes establishing external core function units selected from the group consisting of life cycle management, acquisition, research and development, test and evaluation, in-service engineering, integrated logistic support, program management and platform management.

13. A method according to claim 1, wherein said establishing core function units includes establishing internal core functions selected from the group consisting of facilities, budget and contracts.

14. A method according to claim 1, wherein said establishing core function units includes:

establishing external core function units selected from the group consisting of life cycle management, acquisition, research and development, test and evaluation, in-service

engineering, integrated logistic support, program management and platform management; and

establishing internal core functions selected from the group consisting of facilities, budget and contracts.

15. A method according to claim 1, wherein said establishing core function units includes:

establishing external core function units including life cycle management, acquisition, research and development, test and evaluation, in-service engineering, integrated logistic support, program management and platform management; and

establishing internal core functions including facilities, budget and contracts.

16. A method according to claim 1, wherein said instituting communications includes instituting at least one type of communications selected from the group consisting of telephone, telefax, correspondence and electronic mail.

17. A method according to claim 1, further comprising distributing said coherent presentation among said core function units.

18. A method according to claim 1, wherein said producing information for each core function includes establishing teams, each said team being charged with producing information for a different core function.

19. A method for defining and executing the flow of management operations, said method comprising:

establishing plural units, each said unit involving a different core function;

formulating a manual which prescribes said flow both intrarelationally within each said unit and interrelationally between said units; and

enabling communication in and among said units in furtherance of said flow.

20. A method for defining and executing the flow as recited in claim 19, further comprising dissemination said manual to said units.

21. A method for defining and executing the flow as recited in claim 19, wherein said establishing plural units includes establishing units involving external core functions, said external core function units including life cycle management unit, acquisition unit, research and development unit, test and evaluation unit, in-service engineering unit, integrated logistic support unit, program management unit and platform management unit.

22. A method for defining and executing the flow as recited in claim 19, wherein said establishing plural units includes establishing units involving internal core functions, said internal core function units including facilities unit, budget unit and contracts unit.

23. A method for defining and executing the flow as recited in claim 19, wherein said establishing plural units includes:

establishing units involving external core functions, said external core function units including life cycle management unit, acquisition unit, research and development unit, test and evaluation unit, in-service engineering unit, integrated logistic support unit, program management unit and platform management unit; and

establishing units involving internal core functions, said internal core function units including facilities unit, budget unit and contracts unit.

24. A method for defining and executing the flow as recited in claim 19, wherein said enabling communication includes instituting at least two communication means selected from the group consisting of telephone, telefax, correspondence and e-mail.

25. A method for defining and executing the flow as recited in claim 19, further comprising formulating a policy for continually improving said flow, said formulating a policy including prescribing the periodic updating of said manual.

26. A method for defining and executing the flow as recited in claim 25, wherein said periodic updating of said manual includes changing at least one channel of said said flow between at least two said units.

27. A method for defining and executing the flow as recited in claim 25, wherein said formulating a policy includes adding at least one channel of said said flow between at least two said units.

28. A method for defining and executing the flow as recited in claim 25, wherein said formulating a policy includes removing at least one channel of said said flow between at least two said units.

29. A system for performing workflow management, said system comprising:

a plurality of core functional units;

a manual for utilization by said core functional units, said manual defining said workflow within and between said core functional units; and

means for communication within and between said core functional units.

30. A system for performing workflow management as recited in claim 29, wherein said core functional units comprise external core functional units including a life cycle management unit, an acquisition unit, a research and development unit, a test and evaluation unit, an in-service engineering unit, an integrated logistic support unit, a program management unit and a platform management unit.

31. A system for performing workflow management as recited in claim 29, wherein

said core functional units comprise internal core functional units including a facilities unit, a budget unit and a contracts unit.

32. A system for performing workflow management as recited in claim 29, wherein said core functional units comprise:

external core functional units including a life cycle management unit, an acquisition unit, a research and development unit, a test and evaluation unit, an in-service engineering unit, an integrated logistic support unit, a program management unit and a platform management unit; and

internal core functional units including a facilities unit, a budget unit and a contracts unit.

33. A system for performing workflow management as recited in claim 29, wherein said means for communication include telephone, facsimile transmission, correspondence and electronic mail.

ABSTRACT

A methodology for engineering or re-engineering workflow management strategy, in furtherance of business excellence, is especially suitable for an organization whose business operations involve machinery. The methodology includes the identification of internal and/or external core functions, the preparation of individual written reports each pertaining to a different core function, the assimilation of such reports into a manual for use by the entire organization, the formation of such organization into internal and/or external core function units (which, typically, are at least substantially in accordance with the previously identified core functions), and the creation of one or more modes of systematic communication among the core function units. Suggested internal core functions include facilities, budget and contracts. Suggested external core functions include life cycle management, acquisition, research and development, test and evaluation, in-service engineering, integrating logistic support, program management and platform management.

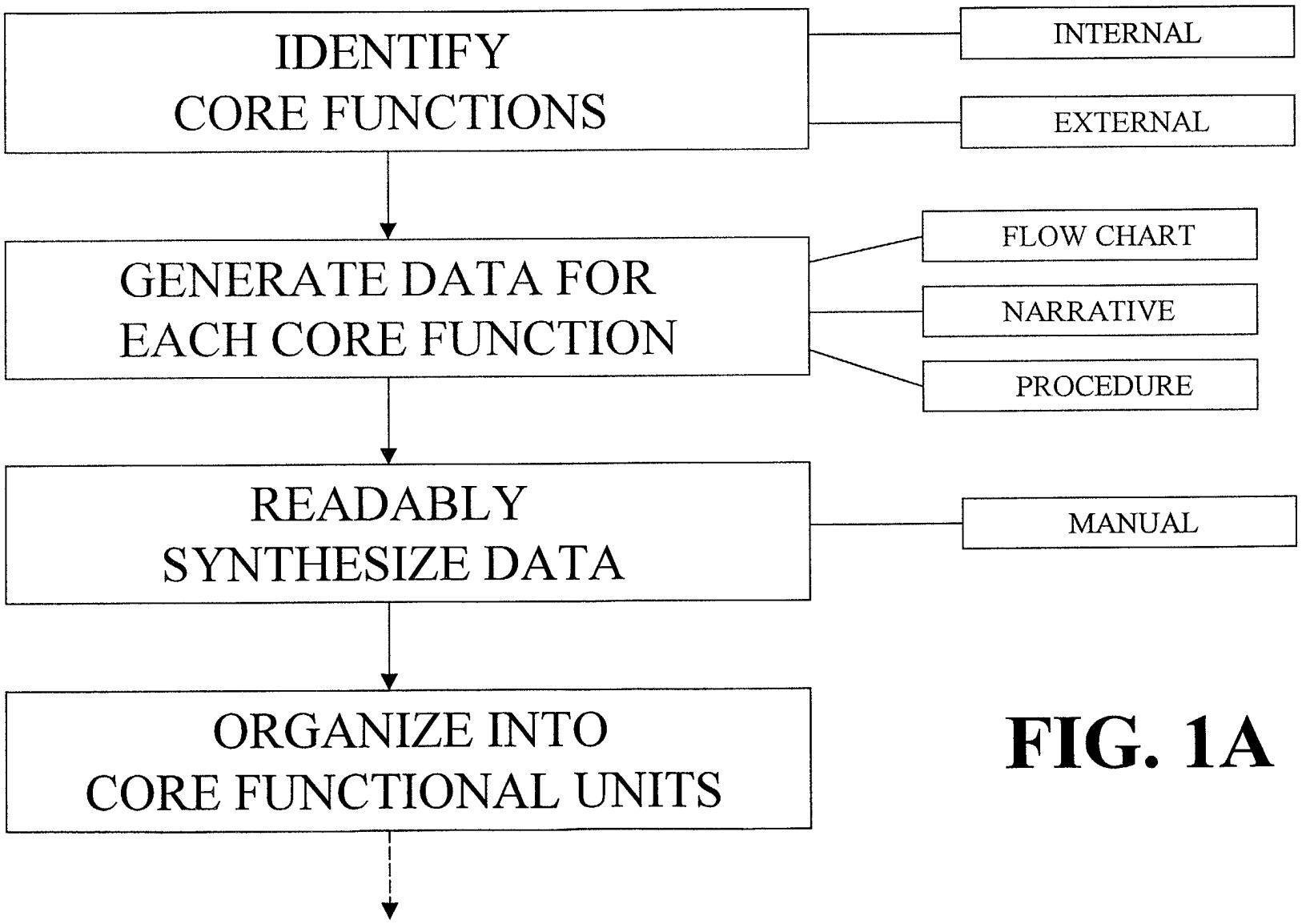

FIG. 1A

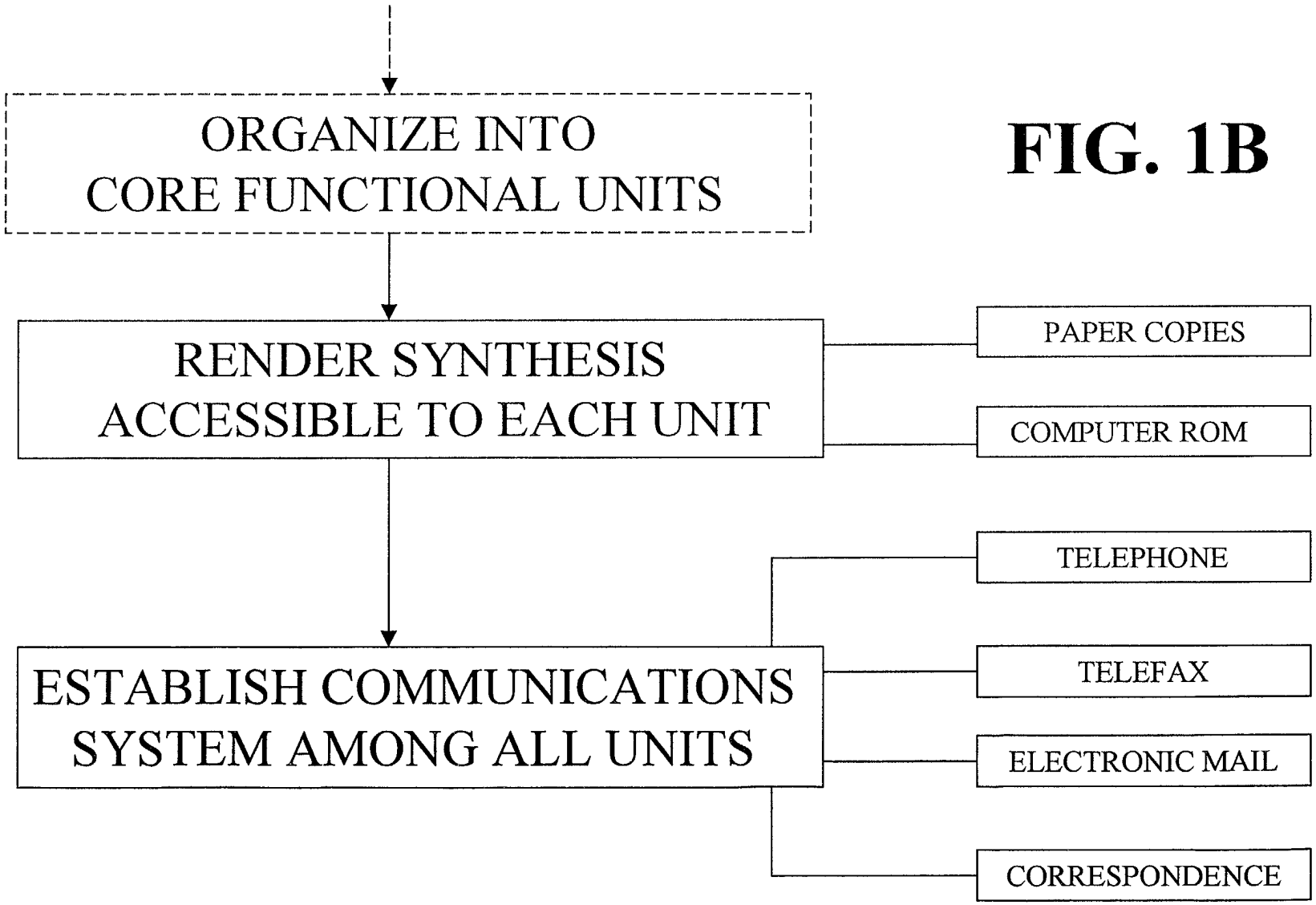

FIG. 1B

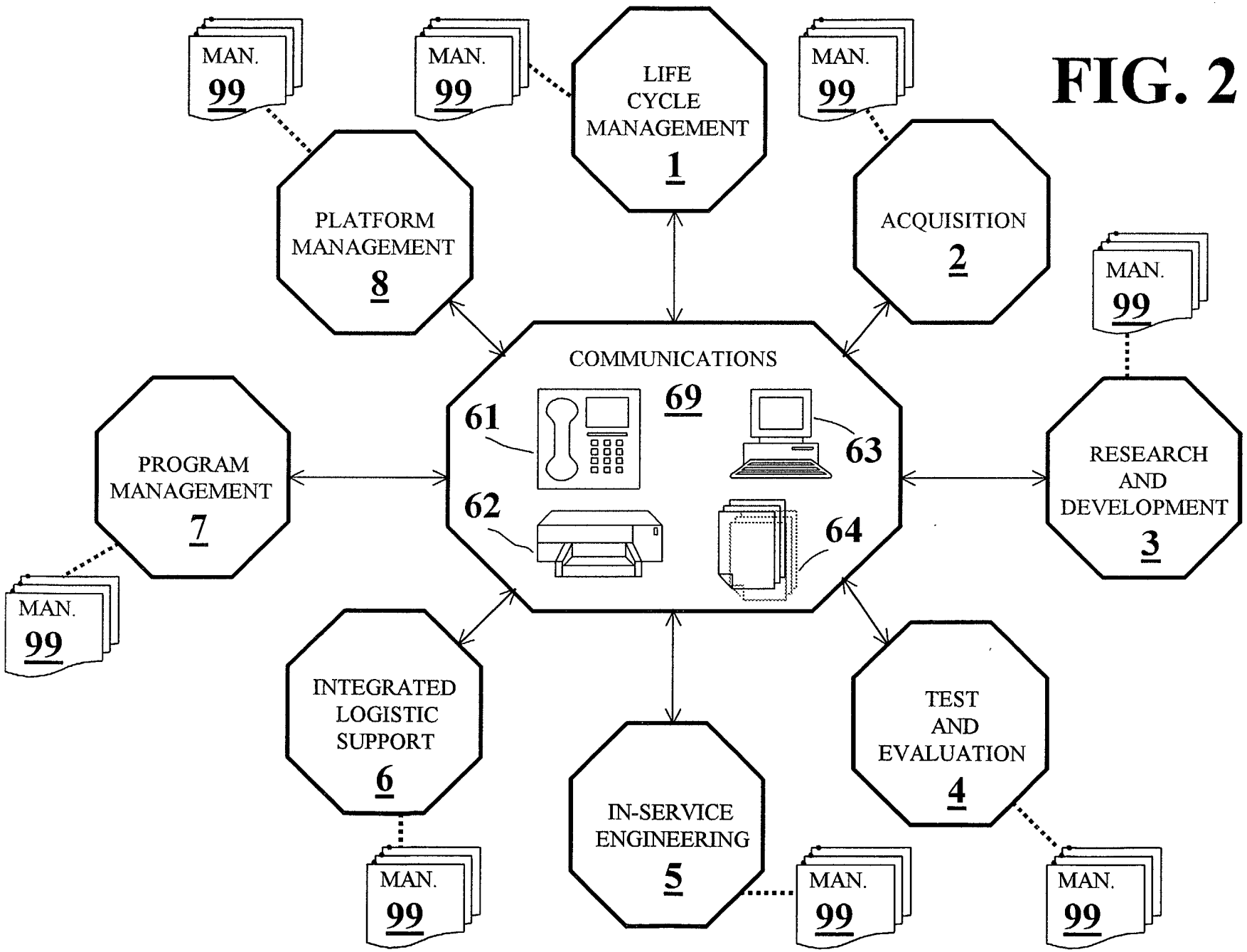

FIG. 2

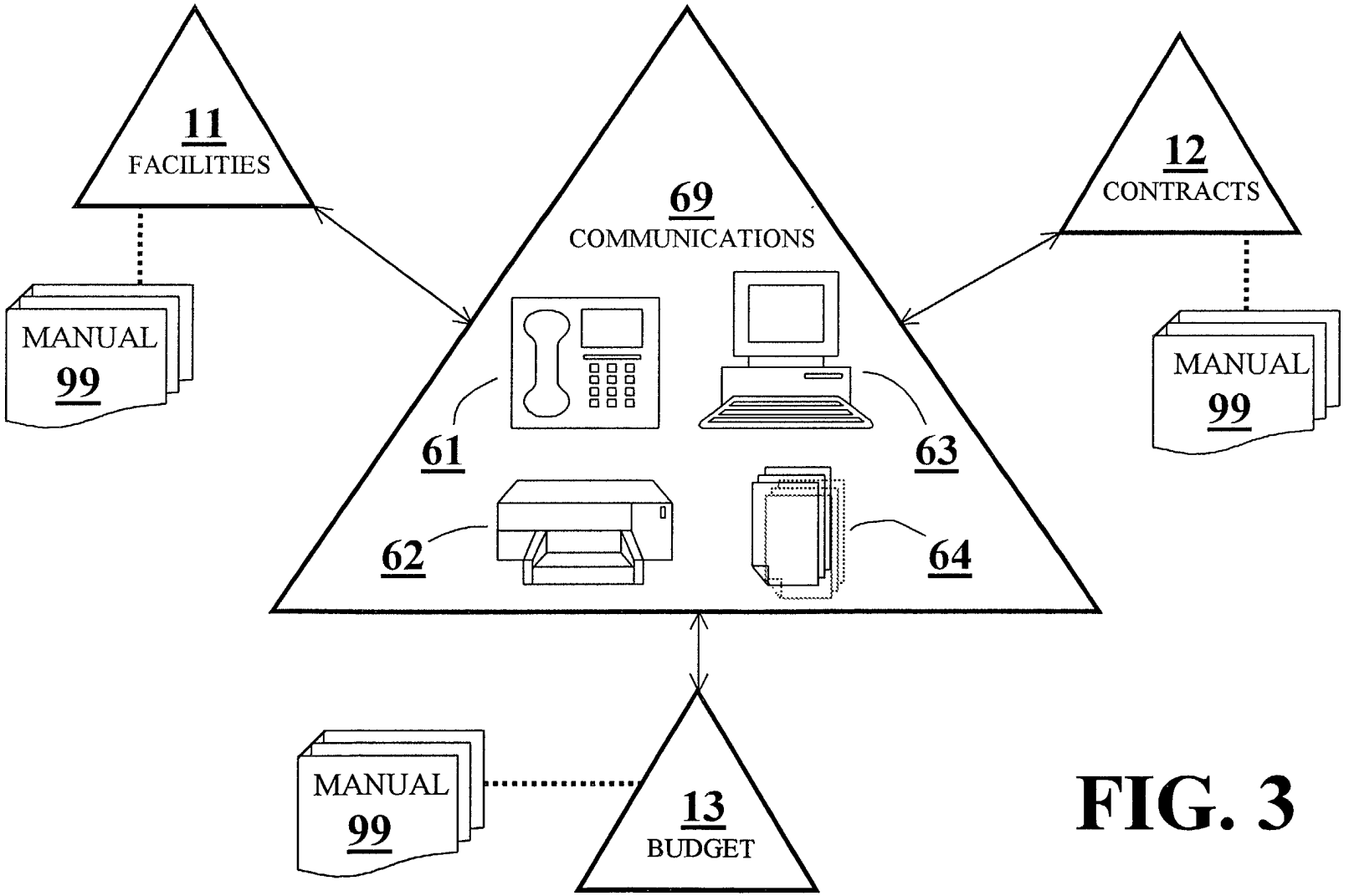

FIG. 3

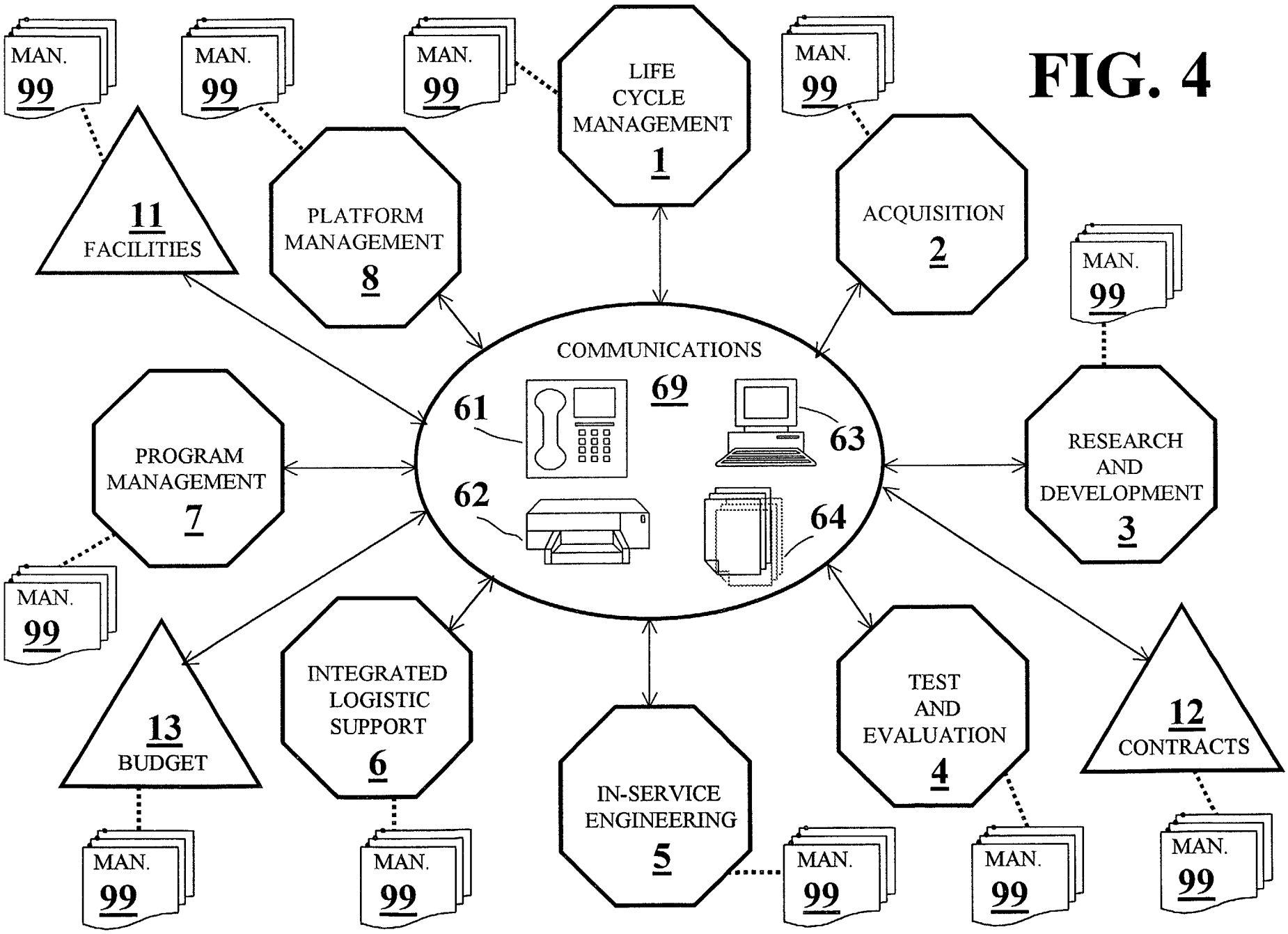
MAN. 99
MAN. 99
MAN. 99
LIFE CYCLE MANAGEMENT 1
MAN. 99
11 FACILITIES
PLATFORM MANAGEMENT 8
ACQUISITION 2
MAN. 99
COMMUNICATIONS
69
61
63
62
64
PROGRAM MANAGEMENT 7
RESEARCH AND DEVELOPMENT 3
MAN. 99
13 BUDGET
INTEGRATED LOGISTIC SUPPORT 6
IN-SERVICE ENGINEERING 5
TEST AND EVALUATION 4
12 CONTRACTS
MAN. 99
MAN. 99
MAN. 99
MAN. 99
MAN. 99

FIG. 4

Navy Case No. 82,114

DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled OPERATING PLAN FOR MACHINERY

the specification of which (check one) ☒ is attached hereto. ☐ was filed on _____ as United States Application Number or PCT International Application Number_____ and was amended on _____.

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code §119(a)-(d) or §365(b) of any foreign application(s) for patent or inventor's certificate, or §365(a) of any PCT international application which designated at least one country other than the United States of America, listed below, and have also identified below any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date	Priority Not Claimed	Certified Copy Attached? Yes	No

I hereby claim the benefit under Title 35, United States Code §119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)
60/217,311	07/10/2000

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s), or §365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulation, §1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

U.S. Parent Application Number	PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number (if applicable)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (list name and registration number), and hereby certify that the Government of the United States has the irrevocable right to prosecute this application:

John L. Forrest, Jr., Reg. No. 29,378; Jacob Shuster, Reg. No. 19,660; Howard Kaiser, Reg. No. 31,381.

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I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor Glenn G. Ward

Inventor's signature _____ Date 8/31/00

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DECLARATION AND POWER OF ATTORNEY FOR PATENT APPLICATION (CONTINUED)

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Inventor's signature Donald J. Collins Date 9/8/00

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Citizenship U.S.A.

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Full name of third inventor Richard A. Stutchfield

Inventor's signature Richard A. Stutchfield Date 9/8/00

Residence 70 Gaunt Drive, Mickleton, New Jersey 08056

Citizenship U.S.A.

Post Office Address 70 Gaunt Drive, Mickleton, New Jersey 08056

APPENDIX A

DIRECTORATE 90 OPERATING PLAN FOR MACHINERY

9 JULY 1999

DRAFT

Naval Surface Warfare Center
CARDEROCK DIVISION
An Activity of Naval Sea Systems Command

Operating Plan for Machinery

Table of Contents

Operating Plan for Machinery

III. Business Model for Machinery

A. Flowcharts
   1. Facilities
   2. Budget
   3. Contracting

B. Narratives
   1. Facilities
   2. Budget
   3. Contracting

C. Procedures
   1. Facilities
   2. Budget
   3. Contracting

Operating Plan for Machinery

Introduction

Over the last decade the US Navy has actively been pursuing a strategy to reduce the cost of building, maintaining and operating their ships. The strategy included closing and realigning facilities and bases, reducing personnel, reforming the acquisition process and privatization of certain functions. The major facets of this strategy that have impacted the business of NSWCCD-SSES are:

1. Base Realignment and Closure (BRAC)
2. NAVSEA Downsizing
3. Transferring Life Cycle Management (LCM) to Philadelphia

BRAC had a major impact on the world of Machinery. The Annapolis site of the Carderock Division was selected to close in 1995 and its Machinery R&D functions transferred to Philadelphia. For the first time all key technical functions (see "Actions Taken:" below) of the life cycle of Machinery were located at one site. The downsizing of NAVSEA meant that SEA 03 would no longer have the manpower to perform their traditional functions. The Navy would be required to transfer certain functions to the field. Ultimately, having all the key elements of Machinery located at one location made the decision to transfer LCM from SEA 03 to Philadelphia straightforward.

Background

The transferring of LCM from SEA 03 to Philadelphia provided us with a unique opportunity to re-look at the business of Machinery. The result of this reassessment is the "Operating Plan for Machinery" (OPM). The OPM addresses the all aspect of Machinery throughout the entire life cycle. **It became apparent that the LCM is the critical building block of the OPM and required careful study.** We decided to take a new approach to LCM. First we identified our goals for LCM. They are:

1. Improve system reliability, maintainability and availability
2. Reduce life cycle costs
3. Reduce the time required to introduce new or enhanced capabilities into the fleet

Prior to the transfer of LCM, engineering was split into Life Cycle Engineering, which was done by SEA 03, and In-Service Engineering, which was done by NSWCCD-SSES. This split was not a natural divide and resulted in redundant capabilities and inefficiencies. The consensus was that engineering should not be divided. By combining

Machinery LCMs are divided into major technical functional areas. These areas were approved by the DMT and are included as attachment 3. Each LCM is responsible for making sure that all the TCPs for their technical functional area are operating properly.

Initially, NSWCCD-SSES and SEA 03, based on the input from 24 Transition Teams signed Memorandums of Agreement (MOA). These MOAs varied widely in scope and detail. There was still confusion as to what responsibilities had been transferred and which remained in SEA 03. Also, funding requirements were in most cases not addressed. Therefore, the LCM will develop a transition plan with the SEA 03 counterpart for its technical functional area using attachment 4 (a checklist developed for transitioning an LCM function) as guidance. This Transition Plan will identify the technical/program management requirements that must be assumed by the receiving organization as well as other considerations necessary to enable sufficient resource planning for a coordinated transfer of program activities.

The LCM will also establish a Steering Committee consisting of the LCM (Committee Chair), ISEA, TYCOM, NAVSEA, NAVICP, OEMs, etc. This committee will be chaired by the LCM and will look at both the near and long term requirements for this technical functional area.

One of the most critical functions performed by the LCM, and the key building block of the OPM, is the development of an effective Master Plan for their technical functional area. This Master Plan is a document identifying the five to seven year life cycle requirements at the system level including prioritized fleet problems and associated solutions. The Master Plan specifies the total workload requirements for all applicable ship classes (as well as cross-platform applications) including LCM, R&D, ISE, SSA, T&E, Ship Acquisition, Logistics, Program/Platform Management and Installation/Backfits. The LCMs will assess the performance at the end of each year and update/modify the Master Plan as appropriate. The OPM now links all the Master Plans to the Programs/Platforms process in order to identify funding sources through the appropriate sponsors (PEO, SEA 03, OPNAV, TYCOM, Shipyards, etc.).

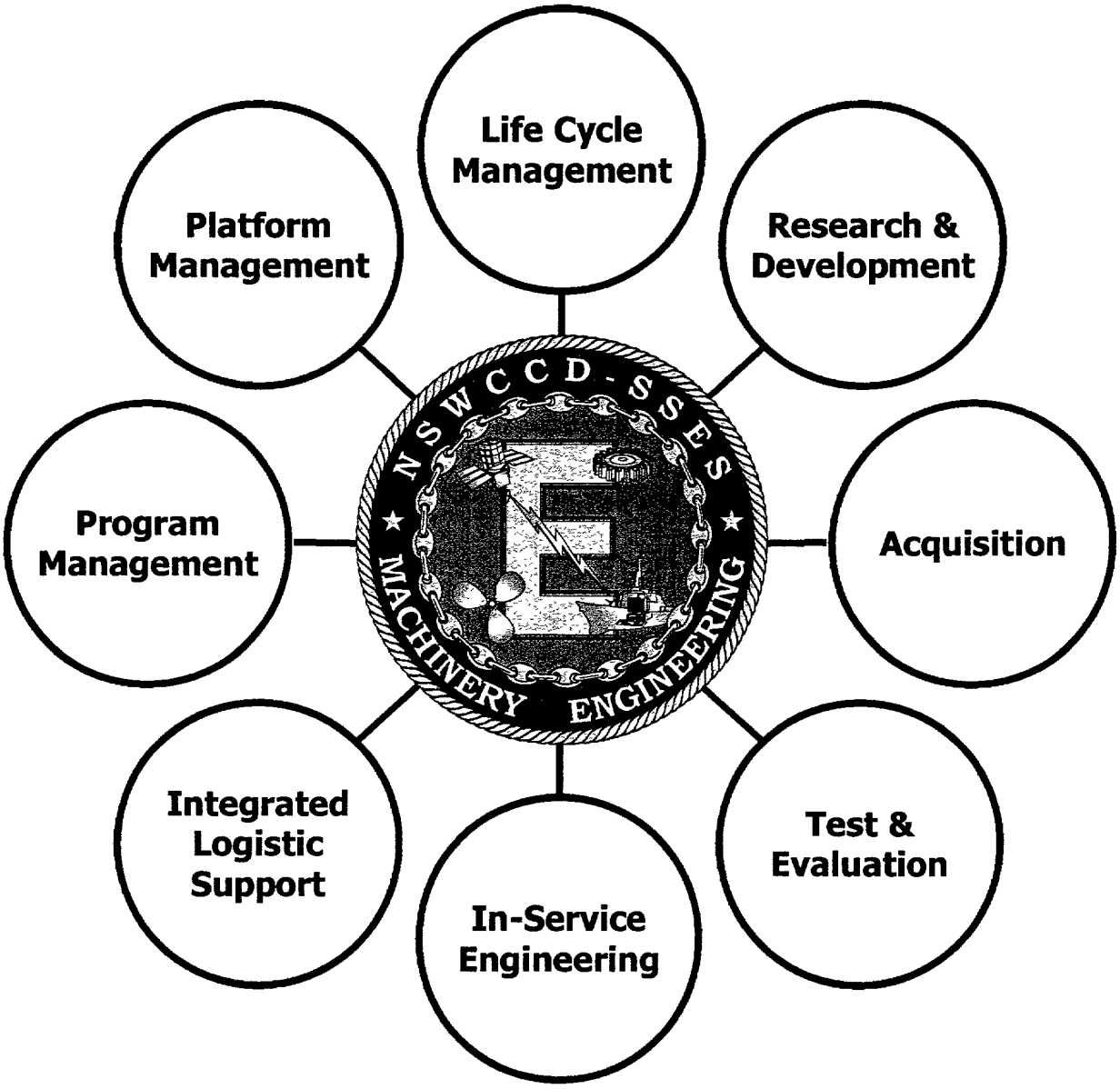
The OPM allows SSES to objectively assess the health of Machinery at a system or Platform level throughout the Navy. Resources can be allocated to the most critical areas and impacts of funding shortfalls can be developed based on data. The OPM will allow SSES to operate the business of Machinery in the most efficient manner for the Navy.

Summary

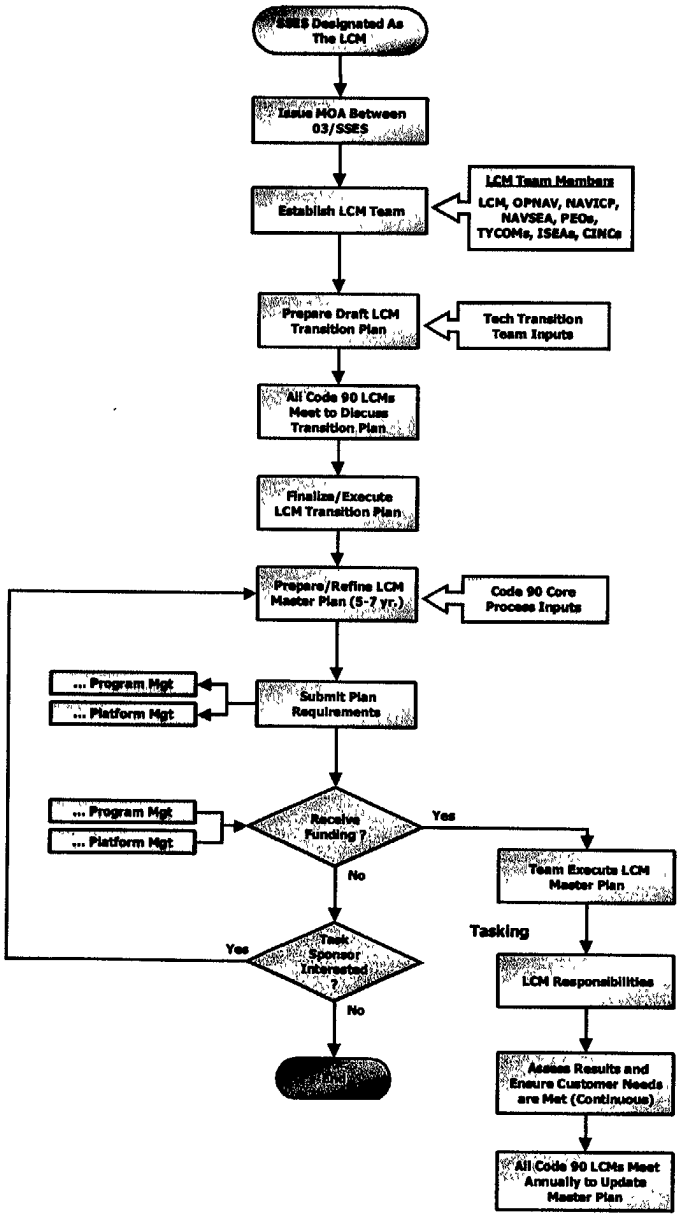
All the TCPs and ICPs are vital parts of the "Operating Plan for Machinery". The processes developed will define the way we do business for the next decade and possibly beyond. LCM is the process that will bind all these key elements of

our business together and is the key building block of the OPM. Embracing this concept of OPM will require change, but the rewards will be critical to the Navy being able to perform its mission into the 21st century.

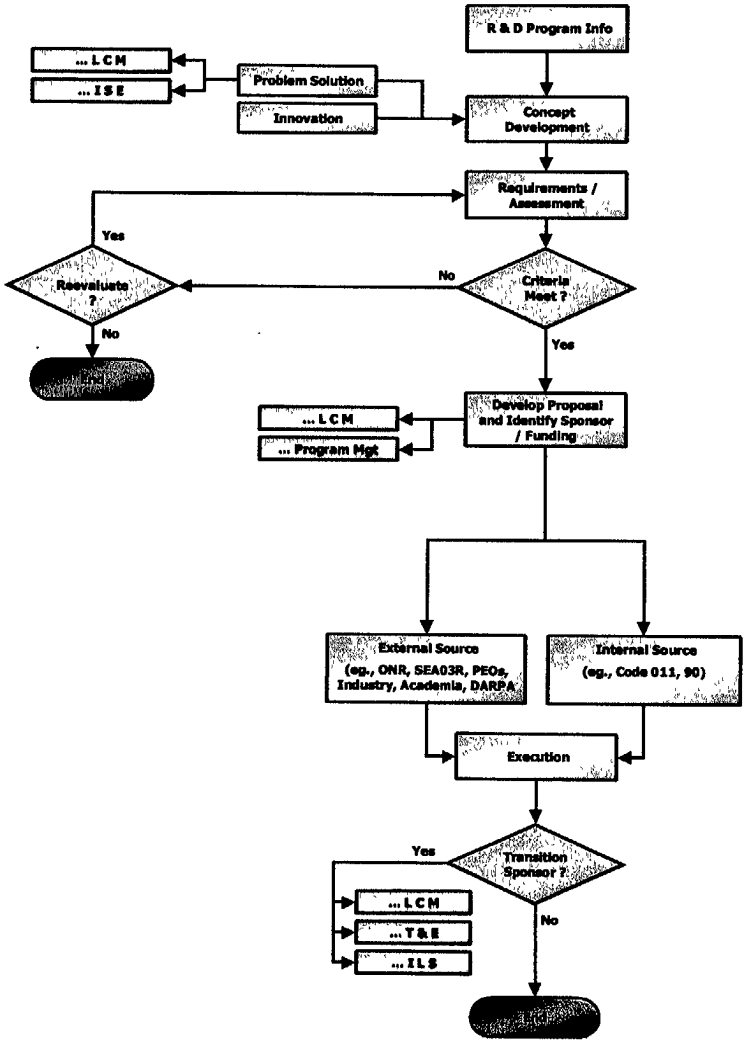
Life Cycle Model For Machinery



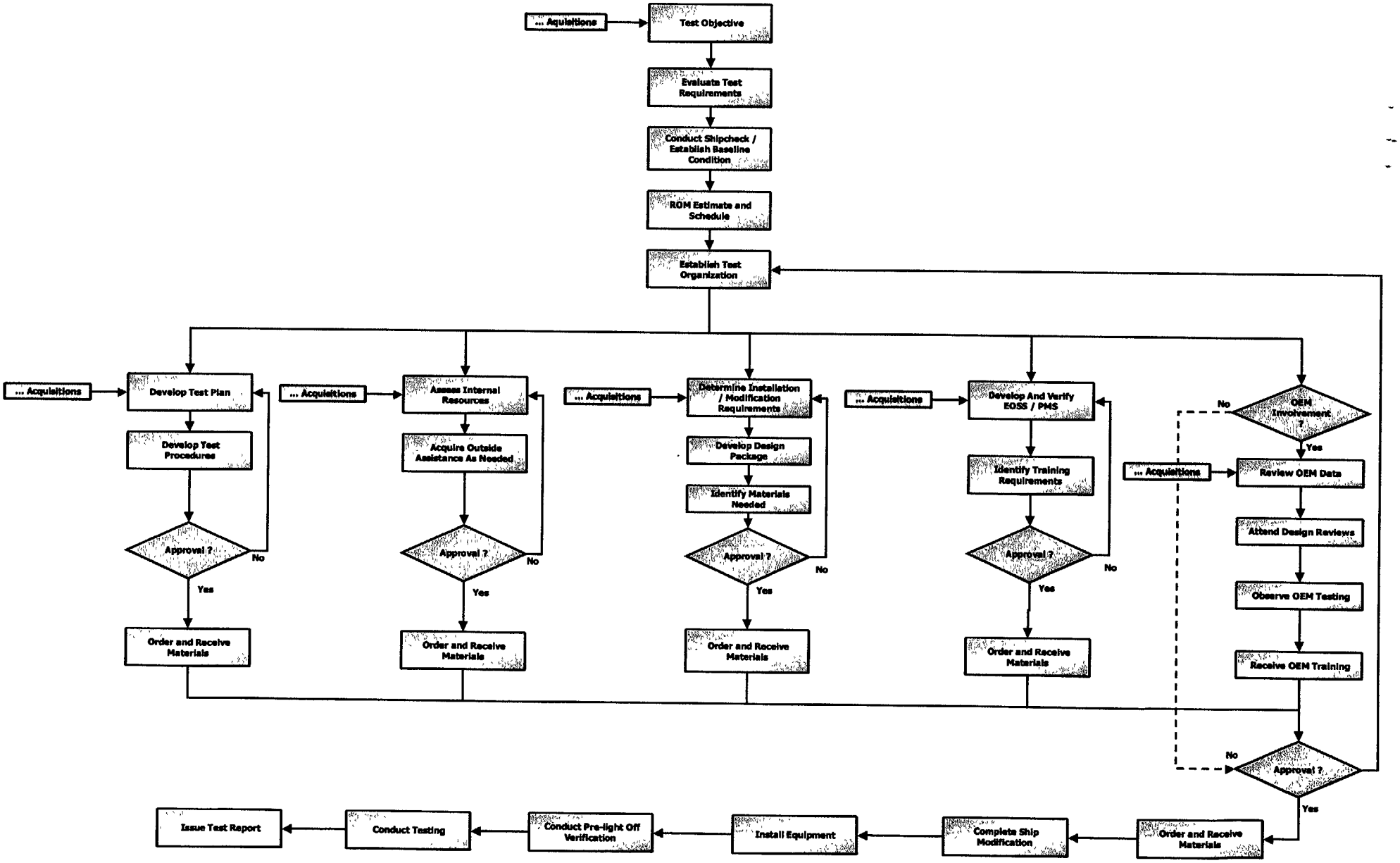
Life Cycle Management



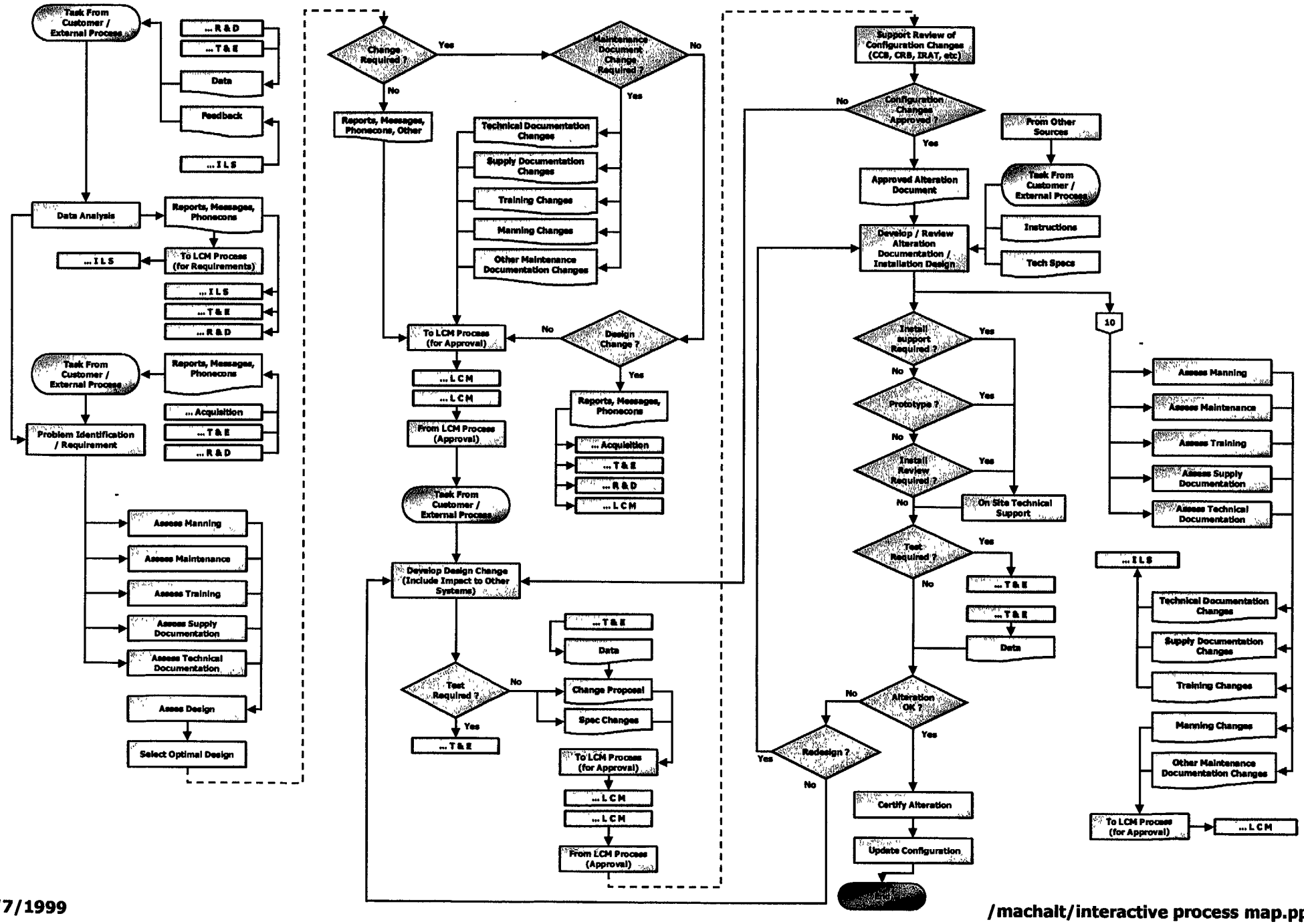
Research and Development



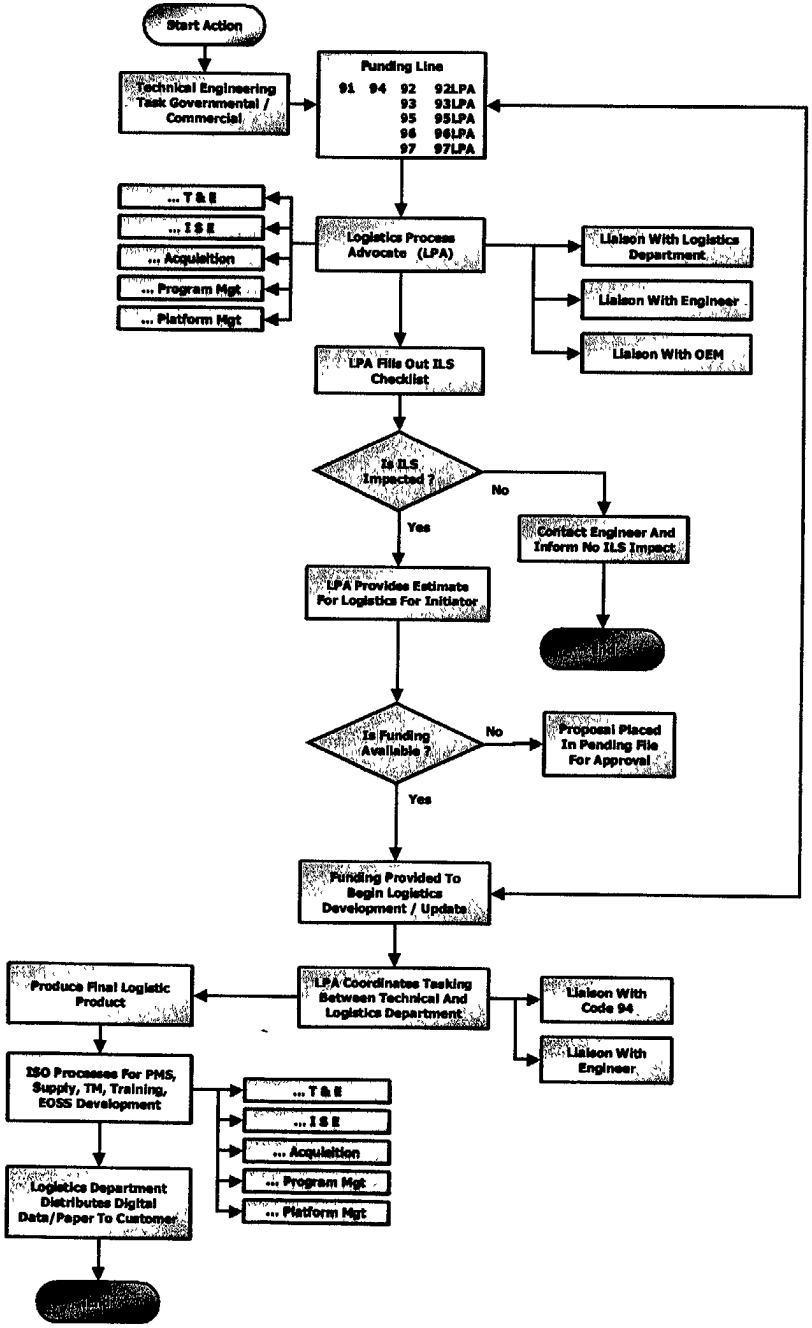
Test and Evaluation Process



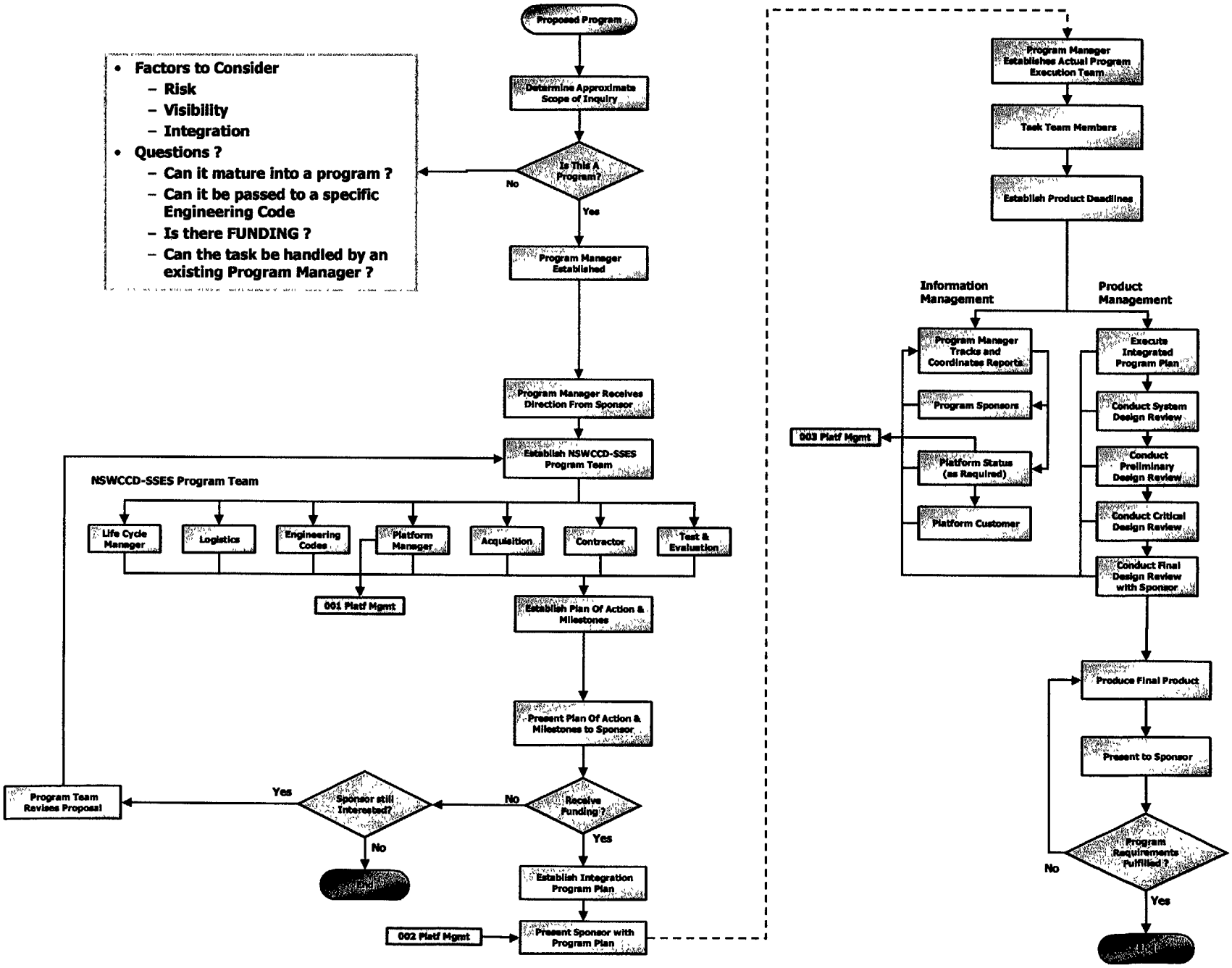
In-Service Engineering



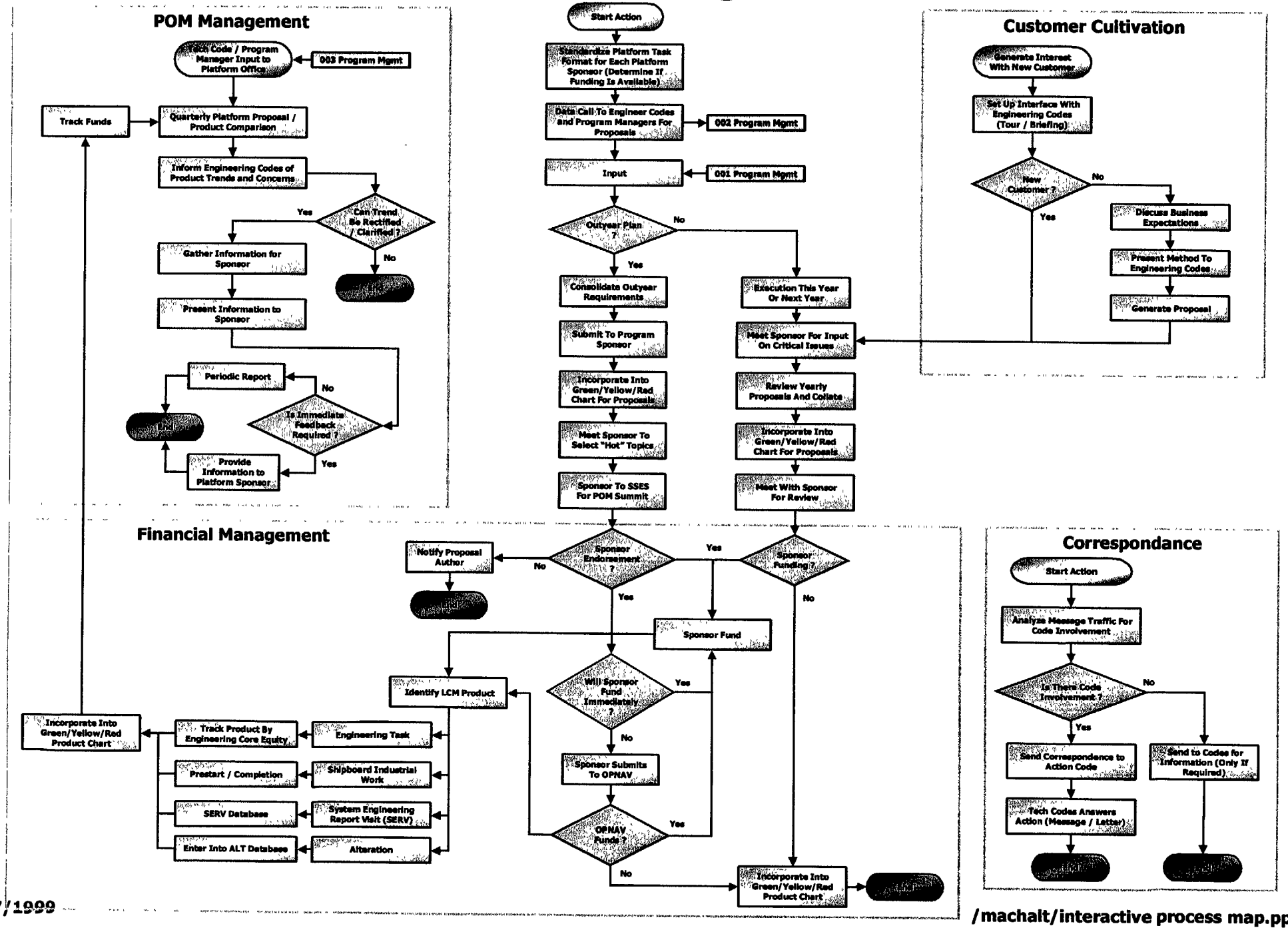
Integrated Logistics Support



Program Management



Platform Management



Life Cycle Management

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1. Improve system reliability, maintainability and availability
2. Reduce life cycle costs
3. Reduce the time required to introduce new or enhanced capabilities into the fleet

Prior to the transfer of LCM, engineering was split into Life Cycle Engineering, which was done by SEA 03, and In-Service Engineering, which was done by NSWCCD-SSES. This split was not a natural divide and resulted in redundant capabilities and inefficiencies. The consensus was that engineering should not be divided. By combining the engineering functions previously performed by SEA 03 and those performed by NSWCCD-SSES the Navy will receive significant savings.

Actions Taken

The above consolidated the engineering function, however, the function of LCM still needed to be addressed and the OPM required definition and development. The code 90 Department Management Team (DMT) realized that the OPM had specific areas that required a documented standardized approach. Therefore the DMT created ten Core Process Teams (CPTs). These CPTs were broken down into two major categories, Technical Core Process Teams (TCPs) and Internal Core Process Teams (ICPs). The teams under each category are:

Operating Plan for Machinery

Technical Core Process Teams
Life Cycle Management
Program/Platform Management
Research and Development
Acquisition Support
Logistics
Test and Evaluation
In-service Engineering

Internal Core Process Teams
Facility Planning
Budget Strategy
Contracting Requirements

These teams were to define their core area, develop their process flows and identify "links" to others Core areas. As mentioned before, we decided to take a new approach to LCM. With the engineering function consolidated, the actual purpose of LCM started to become clear. LCM is the process that binds these Technical Core Functions together (see attachment 1). Each of the TCPs is shown as a circle. LCM is the outer ring that holds all the TCPs together and keeps them from becoming separated. They all overlap. That means all the TCPs must interact and support each other. It's the LCM's function to make sure that the interaction occurs. The LCM process makes sure that one or more TCPs doesn't split away and develop independently (i.e. R&D developing something to sit on a shelf incase someone needs it). If one of the TCPs is not "linked" to the others or funded properly then the Life Cycle is weakened. As each of the TCPs and ICPs develop their process flow charts they will identify the "links". It is an essential function of the LCM to manage these links and make sure they happen.

Machinery LCMs will be divided into major technical functional areas. These areas were approved by the DMT and are included as attachment 2. Each LCM will be responsible for making sure that all the TCPs for their technical functional area are operating properly.

Initially, NSWCCD-SSES and SEA 03 based on the input from 24 Transition Teams signed Memorandums of Agreement (MOA). These MOAs varied widely in scope and detail. There was still confusion as to what responsibilities had been transferred and which remained in SEA 03. Also, funding requirements were in most cases not addressed. Therefore, the LCM will develop a transition plan with the SEA 03 counterpart for its technical functional area using attachment 3 (a checklist developed for transitioning an LCM function) as guidance. The LCM will also establish a Steering Committee consisting of the LCM (Committee Chair), ISEA, TYCOM, NAVSEA, NAVICP, etc. Responsibilities of the LCM detailed in the LCM Process Flow Chart (attachment 4). These responsibilities are:

1. Prepare/execute a system level Master Plan (MP). The MP will project out 3-5 years. The plan includes fleet problems, causes, solutions, milestones, funding requirements and is updated annually.
2. Continuously monitor performance data. Compare goals vice actual performance data.
3. Conduct quarterly Steering Committee meetings to discuss MP status and major issues.
4. Perform as the system expert, maintaining a knowledge base of all aspects of the system.
5. Interface with the fleet on a regular basis to discuss issues, concerns and potential changes to hardware, software (deal through the CSS Integration Agent for Surface Combatants), maintenance, logistics and training.
6. Submit system program planning information and long-term funding requirements through the appropriate Program/Platform Office
7. Ensure program goals are IAW the MP.
8. Ensure "system" is linked to other ship systems to enable complete interoperability as a platform.

Summary

All the TCPs and ICPs are vital parts of the "Operating Plan for Machinery". The processes developed will define the way we do business for the next decade and possibly beyond. LCM is the process that will bind all these key elements of our business together. Embracing this concept of LCM will require change. The time has come! _

R&D PROCESS DESCRIPTION

Introduction

The product of R&D is an operational capability. Hardware is but one subsystem of operational capability. The elements of the total system required to provide an operational capability include:

- Equipment – system hardware plus equipment (trainers, support equipment, etc.) required for its effective utilization and support
- People – trained crews and maintenance personnel plus the support system required for their continuing development and the training of their replacements.
- Facilities
- Material – consumables, spares, etc.
- Information – technical, computer programs, maintenance data, operating tactics, maintenance procedures, etc.

The function of R&D in the development of operational capabilities is the production of the information required to achieve such capabilities. R&D is a multistage information generation and conversion process characterized by the integration and conversion of information within stages and information flow coupling between stages.

R&D is a way of progressively reducing uncertainty by buying information. In the earliest stages of the R&D process, uncertainty usually is very high regarding probable results and the value of the results. Decisions on what and on what not to do are made on the basis of expected value – the predicted value of the payoff if successful, multiplied by the probability of success. Judicious decisions must be made on how much to pay for uncertainty – reducing information before making particular R&D investment decisions. In the case of major weapon or combat support systems, a very substantial investment usually is justified.

Fortunately, costs and uncertainty are inversely related in the R&D process. In the research phase, uncertainty usually is high, but the cost relatively low. In the systems development phase of the process, cost per project can be extremely high while uncertainty is relatively low.

Concept Development

The goal of Research & Development is to strive to meet Navy needs through the development and transition of technology concepts to be applied to forward fit and existing ship systems. These Navy needs include the following:

- Improve the capability to deploy ships or submarines to accomplish specific missions and return them safely to port.
- Improve the operational availability (Ao) of shipboard systems and reduce life cycle costs that support ships or submarines in accomplishing their mission. Life cycle cost components include shipboard manning, parts cost, energy consumption, etc.

Using these needs as a baseline, areas for improvement are identified, and concepts to achieve this are derived from various sources. They include:

Metrics

Metrics identify the expenditure of excessive parts cost and man hours for equipment repair. In addition, equipment downtime and casualty reports identify areas where the operational availability is effected. This information can be used to determine shipboard systems and components that require improvement both on existing and future ships.

Life Cycle Manager and In-Service Engineer

Based upon experience working with individual equipment components or systems, the Life Cycle Manager and In-Service Engineer can provide insight into identifying areas of improvement or highlight failure prone equipment that may not be apparent in metrics data.

R&D efforts from Navy, Other Services, and Industry

Overall improvement options can be derived from evaluating R&D efforts being performed in other areas such as other Department of Defense branches, government agencies, or commercial industry. In addition, 6.1 and 6.2 programs being performed by Navy R&D groups provide a basis for transition.

Once all technology options and areas for improvement are identified, a study plan is developed which evaluates all benefits and issues associated with each option. At the conclusion, the best overall concept is developed for the identified application, to meet the Navy needs.

Requirements & Assessment

A variety of terms is used concerning desired capabilities – e.g., "need", "objective", "target", "problem", or "requirement". While all of these terms denote capabilities of value in accomplishing a mission, they differ in what they imply about a customer's commitment to spend resources for their attainment. Identification of requirements begins with the identification of the customer(s) and identification/categorization of their priorities. Continued development requires definition of "how to measure" these priorities including assigning thresholds and objectives. The formation of the requirements must therefore be accomplished with customer input/representation and a formal, structured process to identify, categorize and prioritize these requirements. Measurable Exit Criteria must be established as part of this structured process. This approach results in the best value in the eye of the customer, among available alternatives, and incorporates performance, cost, schedule, producibility and other factors.

In a high level sense, a mission need is described in a Mission Need Statement (MNS) submitted by OPNAV to the Navy Acquisition Executive (ASN(RD&A)). A requirement generally is outlined in a document by which the customer describes to the technical establishment a specific mission need for resolution. A requirement is documented by an Operational Requirements Document (ORD).

Identification of Sponsor & Funding

The process to identify a sponsor and funding for R&D efforts begins with applying the potential R&D concept to the requirements guidance supplied by various sponsors and/or platforms. Sponsorship and funding could come from an internal source or external source.

Internal sponsorship and funding are typically for Basic Research (6.1 ILIR) or concept development in preparation of proposals for external sponsorship and funding. Internal sources include Code 011 Bid and Proposal (B&P) funding and Code 90 G&A/IOH.

External sponsorship and funding are usually for Applied Research (6.2), Technology Development and Demonstration (6.3), Engineering and Manufacturing Development (6.4) or Continued Development (6.5). External sources include but are not limited to Research Offices (Navy, Marine, Army or Air Force), Research Laboratories (Navy, Army or Air Force), CINCLANT/PAC Science Officers, DARPA (Industry/Academia/Government Consortia), NAVSEA 03D/R, NAVSEA PEOs, MARITECH or MANTECH. There may be more than one sponsor identified. The initial sponsor may or may not be the transition sponsor (i.e. 6.2 Applied Research and/or 6.3 Technology Demonstration could be funded by ONR but the transition sponsor could be a PEO for a new ship/submarine platform).

Execution

Funded R&D tasks are managed to ensure accomplishment of the goals set forth in the proposal. Successful completion of the research/development project requires understanding the risks and managing resources to control budget, schedule, manpower and facilities. Execution of R&D frequently involves the design, development, assembly and testing of an integrated system or component but execution can be limited to software products. Code 90 specializes in the testing of R&D products. These products typically evolve from breadboard to higher fidelity brassboard, to full scale prototypes referred to as the engineering design model (EDM). Code 90 engineers and scientists direct these developments or provide technical consultation to OEM designers. The expertise residing in Code 90 is used to review OEM designs in order to prevent costly mistakes or omissions. The research and development phase of acquisition is concerned primarily with formulating the concept, design, development and qualification of the system or component. R&D meshes with T&E during the qualification test phases. Optimally the EDM undergoes extensive environmental testing (shock, vibration, EMI, etc.), land based testing and shipboard qualification testing. The results of testing are fed back to the R&D program manager for resolution or future refinements.

Technology Insertion

Technology insertion as used in this context refers to one of three potential events following successful execution of the project:

- The progression from one R&D Budget Activity to the next as is usually the case for the pure research end of the R&D spectrum, e.g. BA 6.1 to BA 6.2.
- The progression from pure or applied research to the development end of the R&D spectrum where the next step is usually formal T&E programs.
- The progression to a direct fielded unit.

T & E PROCESS NARRATIVE DESCRIPTIONS
LAND BASED TESTING

6/1/1999

1. TEST OBJECTIVES

Review test objectives provided by the Program Manager. Identify what is to be proven by testing such as; endurance, reliability, structureborne/airborne noise, control systems, performance, engine durability, electrical systems, etc.

LINK TO ISE, R&D OR ACQUISITION PROCESS.

2. EVALUATE TEST REQUIREMENTS

Determine what is needed to perform testing that accomplishes the test objectives such as; waterbrake, loadbanks, instrumentation, alignment tools, vibration monitoring equipment, etc.

3. CONDUCT FACILITY ASSESSMENT

Evaluate test facility to determine specific needs related to the type of test required. Determine the necessary changes to the facility to meet these needs. Develop system safety program requirements.

Determine what facility support services, and conditions are required to conduct testing; for example: air, water, electrical services, etc.

LINK TO ISE, R&D OR ACQUISITION AND FACILITIES PROCESSES.

4. ROM ESTIMATE AND SCHEDULE

Develop Rough Order of Magnitude (ROM) cost estimates based on the established test objectives, test requirements, and facility assessment. Submit ROM estimate to the Program Manager for approval.

If approval is granted, establish funding status and reporting.

5. ESTABLISH TEST ORGANIZATION

The Program Manager shall establish a test organization to manage all aspects of the test program. A typical test organization consists of a Program Manager; a Design Manager to manage the test site design functions; a Construction Manager to manage the site construction; and a Test Manager to manage the test plan and test procedure development; test schedule; test conduct and test analysis; and test report development. Test Engineers and Test Operators, included in this organization, conduct testing.

6. ORIGINAL EQUIPMENT MANUFACTURER (OEM) INVOLVEMENT

If there is OEM involvement, proceed to step 17 after completion of step 16.

If there is no OEM involvement, proceed to step 21 after completion of step 16.

7. DEVELOP TEST PLAN

A Test Plan shall be developed in accordance with the Total Ship Test Program (TSTP) Manual, NAVSEA 0900-LP-095-2010. A comprehensive test plan shall be submitted to the Program Manager for review and approval. The comprehensive test plan shall include as a minimum the following:

- A description of the test organization, including a description of how it will interface with the Program test organization.
- A description of the Test Program Objectives.
- Index of and schedule for the development and validation of test documentation for which the test facility has responsibility, including for each test a reference to the related test narrative in the ship specification.
- A schedule of all testing in time phased sequence showing the interrelationship between events.

- A description of the test facility's problem reporting and resolution system.
- Instrumentation Plan.

Submit completed Test Plan to the Program Manager.

LINK TO ISE, R&D OR ACQUISITION PROCESS.

8. DEVELOP TEST PROCEDURES

Develop test procedures as detailed descriptions of the operations to be performed during the conduct of a specific test. Test procedures shall be developed in accordance Total Ship Test Program (TSTP) manual, NAVSEA 0900-LP-095-2010 and the applicable governing technical documentation, i.e. MIL SPEC, MIL STD, NSTM, etc. Test procedures shall be reviewed by the appropriate technical codes.

Test procedures have data sheets and must be "stand-alone" documents to describe the sequence of events required to perform the test without recourse to references other than EOSS. Requirements and guidance for developing test procedures are contained in DOD-STD-2106 (NAVY). Signed procedures are to be part of the MRP package.

LINK TO ISE, R&D OR ACQUISITION PROCESS.

9. ASSESS INTERNAL RESOURCES

Assess the personnel assets required to develop test site. Review this against the personnel assets available.

Assess the non-personnel assets identified in step 2. Review these requirements against the items available.

LINK TO ISE, R&D OR ACQUISITION, AS WELL AS INTEGRATED LOGISTICS SUPPORT, AND FACILITIES PROCESSES.

10. ACQUIRE OUTSIDE ASSISTANCE AS NEEDED

If requirements are identified in step 9, either manpower or equipment, make arrangements to contract for those assets.

LINK TO CONTRACTS PROCESS.

11. DETERMINE CONSTRUCTION REQUIREMENTS

Assess the designated test site location and determine the level of construction required to install the equipment to be tested (structure, reinforcement, building modification, etc.)

LINK TO FACILITIES PROCESS.

12. DEVELOP DESIGN PACKAGE

Develop a Design Package in accordance with MIL-DTL-31000A, Design Specification Technical Data Packages. The design package should include the required drawings and procurement specifications to design new/or modify existing test sites.

A typical design package consists of Conceptual, Preliminary and Detail Design drawings (mechanical, electrical, and structural drawings); (instrumentation drawings are typically developed by the instrumentation code); engineering calculations that support design; material list and procurement specifications with lists of recommended vendors.

In some instances, the conceptual phase is eliminated. Design phases and products are usually driven by complexity and funding.

All design package items shall be subject to the review and acceptance of the appropriate Technical Codes.

LINK TO ISE, R&D OR ACQUISITION PROCESS.

13. IDENTIFY MATERIAL NEEDS

Identify material needs required to construct test site based on design drawings.

LINK TO ISE, R&D OR ACQUISITION PROCESS.

14. DEVELOP AND VERIFY EOSS/PMS

Engineering Operational Sequencing System (EOSS) shall be developed in accordance with the EOSS Development Handbook. This handbook covers the requirements and the standards for the development and production of the EOSS for standardizing the operation of the propulsion plants of Non-Nuclear Powered Surface Navy Ships. The EOSS and associated documents are covered as follows:

Engineering Operational Procedures (EOP). EOP is the portion of the EOSS which establishes a set of standardized, technically correct and properly sequenced procedures and supporting charts, diagrams, and tables for the normal operation of the ship's propulsion plant.

Engineering Operational Casualty Control (EOCC). EOCC is the portion of the EOSS which establishes a set of casualty control procedures which will provide propulsion plant operators with the information, actions, and communications necessary for casualty recognition, control of specific abnormal conditions for preventing impending casualties, isolation of casualties when they occur, and the placing of the propulsion plant into a stable condition from which the plant and affected components can be returned to normal plant operation.

EOSS documentation is developed by or can be obtained from Code 943 for all procedures identified above.

PMS documentation is a package of required planned maintenance actions and procedures

for all test equipment and is developed by or can be obtained from Code 942, prior to test operation.

LINK TO ISE, R&D OR ACQUISITION, AS WELL AS INTEGRATED LOGISTICS SUPPORT PROCESSES.

15. IDENTIFY TRAINING REQUIREMENTS

All personnel who operate equipment and systems for tests are required to have training qualification certificates for that particular equipment/system/site. Qualification certificates for individuals are to be retained by Code 914, to form a permanent and current record of personnel qualifications. Personnel who operate shop equipment, such as flushing and hydropumps on a frequent basis, require only the authorization of Code 914. Training shall be in accordance with NAVSSESINST 3900.3D.

Training of test engineers and test operators shall be in accordance with the NAVSSESINST 3900.3D.

The Test Manager shall sign an endorsement sheet for the completion of each part of the training required. Operator endorsement sheets shall be counter signed by Code 914; and EOOW endorsement sheets shall be countersigned by Code 914; and Engineering Officer of the Watch (EOOW) endorsement sheets shall be countersigned by the Programs and Platforms Department (Code 91).

LINK TO ISE, R&D OR ACQUISITION, AS WELL AS INTEGRATED LOGISTICS SUPPORT PROCESSES.

16. DEVELOP MRP PACKAGE

The mission of the MRP is to ensure the test will be carried out under sufficient control, and in such conditions, to minimize the risk of personal injury or machinery and equipment failure.

The MRP package shall be developed in accordance with NAVSSESINST 3900.3D, Mission Readiness Panels (MRP). This instruction provides an outline and checkoff list that identifies documents required in the compilation of the MRP package with the responsible code indicated.

LINK TO ISE, R&D, OR ACQUISITION AS WELL AS FACILITIES PROCESSES.

17. REVIEW ORIGINAL EQUIPMENT MANUFACTURER (OEM) DATA

Obtain OEM data (drawings, technical documentation) and review those documents to gain an understanding of the design features, installation methods and operational methods of the equipment to be tested.

LINK TO ISE, R&D OR ACQUISITION PROCESS.

18. ATTEND OEM DESIGN REVIEWS

Attend design review meetings and provide technical input. Assist in decision making and provide impact of recommended changes.

LINK TO ISE, R&D OR ACQUISITION PROCESS.

19. OBSERVE OEM TESTING

Go to the OEM's facility and observe shop testing of the equipment. Gain insight into test methods and render opinions into the test methods and results.

LINK TO ISE, R&D OR ACQUISITION PROCESS.

20. RECEIVE OEM TRAINING

Receive training from the OEM on the equipment he manufactured. Training should support operations, testing and analysis of test results.

21. APPROVAL

Verify all aspects of test preparation are satisfactorily completed. If yes, proceed to step 22.

If no, reevaluate blocks 6-20.

22. ORDER AND RECEIVE MATERIAL

Order all material required for testing. Conduct receipt inspections to ensure satisfactory receipt of material. Maintain inventory management of material.
LINK TO CONTRACTS PROCESS.

23. COMPLETE SITE CONSTRUCTION

Complete site construction in accordance with approved drawings.

24. INSTALL EQUIPMENT

Install equipment in accordance with approved drawings, alignment procedures, and OEM specifications, etc.

25. CONDUCT MRP PROCESS

Conduct MRP Process in accordance with NAVSSESINST 3900.3D, Mission Readiness Panels (MRP). This process will include a pre-light off verification and a final site inspection. At this stage all work on the site must have been completed and site ready for light-off. The results of this inspection are to be reported at the final MRP review. Failure to achieve the required standards at this inspection will delay the final MRP review.

Upon correction of any deficiencies the MRP Chairperson will authorize light-off.

26. CONDUCT TESTING

Upon the successful completion of EOSS "hot checks," the MRP Chairperson will authorize operation. Testing shall be conducted in accordance with the approved test plan, test schedule, and test procedures.

27. ISSUE TEST REPORT

Test reports shall be developed in accordance with MIL-STD-831, Preparation of Test Reports.

This standard describes the format and content to be used in the preparation of test reports covering tests on systems, subsystems, equipment, components, and parts.
Test report shall be submitted to the Program Manager.
LINK TO ISE, R&D OR ACQUISITION PROCESS.

LIST OF REFERENCES

1. NAVSEA 0900-LP-095-2010, Total Ship Test Program (TSTP) Manual.
2. DOD-STD-2106 (NAVY), Development of Shipboard Industrial Test Procedures.
3. MIL-DTL-31000A, Detail Specification Technical Data Packages.
4. EOSS Development Handbook.
5. MIL-P-24534A (NAVY), Planned Maintenance System.
6. NAVSSESINST 3900.3D, Mission Readiness Panels.
7. MIL-STD-831, Preparation of Test Reports.

T & E PROCESS NARRATIVE DESCRIPTIONS
SHIPBOARD TESTING

6/1/1999

1. TEST OBJECTIVES

Review test objectives provided by the Program Manager. Identify what is to be proven by testing such as; endurance, reliability, structureborne/airborne noise, control systems, performance, engine durability, electrical systems, etc.

LINK TO ISE, R&D OR ACQUISITION PROCESS.

2. EVALUATE TEST REQUIREMENTS

Determine what is needed to perform testing that accomplishes the test objectives such as; loadbanks, instrumentation, alignment tools, vibration monitoring equipment, etc.

3. CONDUCT SHIPCHECK/ESTABLISH BASELINE CONDITIONS

Go aboard the designated ship and assess the area where the equipment is to be installed. Determine rip out requirements and other modifications to existing configuration. Establish baseline conditions that exist prior to installation of equipment to be tested.

LINK TO ISE, R&D OR ACQUISITION PROCESS.

4. ROM ESTIMATE AND SCHEDULE

Develop Rough Order of Magnitude (ROM) cost estimates based on the established test objectives, test requirements, and facility assessment. Submit ROM estimate to the Program Manager for approval.

If approval is granted, establish funding status and reporting.

5. ESTABLISH TEST ORGANIZATION

The Program Manager shall assign Test Engineers and Test Operators as required.

6. ORIGINAL EQUIPMENT MANUFACTURER (OEM) INVOLVEMENT

If there is OEM involvement, proceed to step 17 after completion of step 16.

If there is no OEM involvement, proceed to step 21 after completion of step 16.

7. DEVELOP TEST PLAN

A Test Plan shall be developed in accordance with the Total Ship Test Program (TSTP) Manual, NAVSEA 0900-LP-095-2010. A comprehensive test plan shall be submitted to the Program Manager for review and approval. The comprehensive test plan shall include as a minimum the following:

- A description of the test organization, including a description of how it will interface with the Program test organization.
- A description of the Test Program Objectives.
- A schedule of all testing in time phased sequence showing the interrelationship between events.
- A description of the test facility's problem reporting and resolution system.
- Instrumentation Plan.

Submit completed Test Plan to the Program Manager.

LINK TO ISE, R&D OR ACQUISITION, AS WELL AS INTEGRATED LOGISTICS SUPPORT PROCESSES.

8. DEVELOP TEST PROCEDURES

Develop test procedures as detailed descriptions of the operations to be performed during the conduct of a specific test. Test procedures shall be developed in accordance Total Ship Test Program (TSTP) manual, NAVSEA 0900-LP-095-2010 and the applicable governing

technical documentation, i.e. MIL SPEC, MIL STD, NSTM, etc. Test procedures shall be reviewed by the appropriate technical codes.

Test procedures have data sheets and must be "stand-alone" documents to describe the sequence of events required to perform the test without recourse to references other than EOSS. Requirements and guidance for developing test procedures are contained in DOD-STD-2106 (NAVY).

LINK TO ISE, R&D OR ACQUISITION, AS WELL AS INTEGRATED LOGISTICS SUPPORT PROCESSES.

9. ASSESS INTERNAL RESOURCES

Assess the personnel assets required to develop test site. Review this against the personnel assets available.

Assess the non-personnel assets identified in step 2. Review these requirements against the items available at the station.

LINK TO ISE, R&D OR ACQUISITION, AS WELL AS INTEGRATED LOGISTICS SUPPORT, AND FACILITIES PROCESSES.

10. ACQUIRE OUTSIDE ASSISTANCE AS NEEDED

If requirements are identified in step 9, either manpower or equipment, make arrangements to contract for those assets.

LINK TO CONTRACTS PROCESS.

11. DETERMINE INSTALLATION/MODIFICATION REQUIREMENTS

Determine piping modifications and structural modifications required for the installation of the equipment to be tested. Assess rigging routes to get equipment to be tested to its designated location. Evaluate methods in which preparation for equipment will be made, ie. Burning, grinding, welding, etc. Evaluate the impact on shipboard day-to-day functions, crew habitability and degradation of neighboring equipment.

LINK TO ISE, R&D OR ACQUISITION PROCESS.

12. DEVELOP DESIGN PACKAGE

Develop a Design Package in accordance with MIL-DTL-31000A, Design Specification Technical Data Packages. The design package should include the required drawings and procurement specifications to design new/or modify existing shipboard configuration.

A typical design package consists of mechanical, electrical, and structural drawings (instrumentation drawings are typically developed by the instrumentation code); engineering calculations that support design; material list and procurement specifications with lists of recommended vendors.

All design package items shall be subject to the review and acceptance of the appropriate Technical Codes.

LINK TO ISE, R&D OR ACQUISITION PROCESS.

13. IDENTIFY MATERIAL NEEDS

Identify material needs required to support shipboard testing.

LINK TO ISE, R&D OR ACQUISITION PROCESS.

14. DEVELOP AND VERIFY EOSS/PMS

Engineering Operational Sequencing System (EOSS) shall be developed in accordance with the EOSS Development Handbook. This handbook covers the requirements and the standards for the development and production of the EOSS for standardizing the operation of the propulsion plants of Non-Nuclear Powered Surface Navy Ships. The EOSS and associated documents are covered as follows:

Engineering Operational Procedures (EOP). EOP is the portion of the EOSS which establishes a set of standardized, technically correct and properly sequenced procedures and supporting charts, diagrams, and tables for the normal operation of the ship's propulsion plant.

Engineering Operational Casualty Control (EOCC). EOCC is the portion of the EOSS which establishes a set of casualty control procedures which will provide propulsion plant operators with the information, actions, and communications necessary for casualty recognition, control of specific abnormal conditions for preventing impending casualties, isolation of casualties when they occur, and the placing of the propulsion plant into a stable condition from which the plant and affected components can be returned to normal plant operation.

EOSS documentation is developed by or can be obtained from Code 943 for all procedures identified above.

PMS documentation is a package of required planned maintenance action and procedures and shall be developed for each ship for ship's force use in monitoring material readiness after the ship is turned over to the fleet. The PMS package is to be developed by or can be obtained from Code 942, prior to test operation.

LINK TO ISE, R&D OR ACQUISITION, AS WELL AS INTEGRATED LOGISTICS SUPPORT PROCESSES.

15. IDENTIFY TRAINING REQUIREMENTS

Training of test engineers and test operators is the responsibility of the technical code performing the test.

LINK TO ISE, R&D OR ACQUISITION, AS WELL AS INTEGRATED LOGISTICS SUPPORT PROCESSES.

17. REVIEW ORIGINAL EQUIPMENT MANUFACTURER (OEM) DATA

Obtain OEM data (drawings, technical documentation) and review those documents to gain an understanding of the design features, installation methods and operational methods of the equipment to be tested.

LINK TO ISE, R&D OR ACQUISITION PROCESS.

18. ATTEND OEM DESIGN REVIEWS

Attend design review meetings and provide technical input. Assist in decision making and provide impact of recommended changes.

LINK TO ISE, R&D OR ACQUISITION PROCESS.

19. OBSERVE OEM TESTING

Go to the OEM's facility and observe shop testing of the equipment. Gain insight into test methods and render opinions into the test methods and results.

LINK TO ISE, R&D OR ACQUISITION PROCESS.

20. RECEIVE OEM TRAINING

Receive training from the OEM on the equipment he manufactured. Training should support operations, testing and analysis of test results.

21. APPROVAL

Verify all aspects of test preparation are satisfactorily completed. If yes, proceed to step 22.

If no, reevaluate blocks 6-20.

22. ORDER AND RECEIVE MATERIAL

Order all material required for testing. Conduct receipt inspections to ensure satisfactory receipt of material. Maintain inventory management of material.

23. COMPLETE SHIP MODIFICATIONS

Complete any required rip outs, piping modifications, structural modifications or any other changes required to be made in the area where the equipment to be tested will be installed. Ensure all piping is once again sound. Ensure all structural members are replaced. Remove any debris resulting from modifications. Ensure the area is satisfactory to ship's force prior to equipment installation. All work should be in accordance with NAVSSESINST 4720.23.

24. INSTALL EQUIPMENT

Install equipment in accordance with approved drawings, alignment procedures, and OEM specifications, etc.

25. CONDUCT PRE-LIGHT OFF VERIFICATION

After equipment installation and prior to start-up, verify installation, i.e. verify that all foundation bolts are in place, all piping joints are fully made up, and all electrical connections are completed. Verify there is adequate lighting in the area. Verify that all gages are mounted and secure. Conduct any pre light-off testing that may be required, i.e. piping hydrostatic test for disturbed piping. Conduct electrical checks of any new or disturbed electrical connections. Verify the area is free of debris, all safety devices are in place, and all appropriate warning signs and label plates are mounted.

26. CONDUCT TESTING

Conduct testing in accordance with approved Test Plan and Test Procedures.

27. ISSUE TEST REPORT

Test reports shall be developed in accordance with MIL-STD-831, Preparation of Test Reports.

This standard describes the format and content to be used in the preparation of test reports covering tests on systems, subsystems, equipment, components, and parts.

Test report shall be submitted to the Program Manager.

LINK TO ISE, R&D OR ACQUISITION PROCESS.

LIST OF REFERENCES

1. NAVSEA 0900-LP-095-2010, Total Ship Test Program (TSTP) Manual.
2. DOD-STD-2106 (NAVY), Development of Shipboard Industrial Test Procedures.
3. MIL-DTL-31000A, Detail Specification Technical Data Packages.
4. EOSS Development Handbook.
5. MIL-P-24534A (NAVY), Planned Maintenance System.
6. NAVSSESINST 4720.2C, Process and Policy for Shipboard Industrial Work.
7. MIL-STD-831, Preparation of Test Reports.

INTEGRATED LOGISTICS PROCESS

Introduction

Dollars/tasks arrive into the NSWCCD-SSES from both Government and commercial customers. Government customers are PEOs, NAVSEA, Type Commanders, Fleet assets and Space and Warfare Systems Command.

These dollars/tasks can take several routes in the Command: Code 91 Program managers, Code 94 Logistics engineers, Code 92/93/95/96/97 ISEAs and the Logistics Process Advocates [LPA] in each department.

If the task/dollars arrives any way other than through the LPAs, that person will provide the task to the LPA.

Responsibilities

The LPA will liaison with the Logistics Department, the ISEA and the OEM to ensure that the lines of communication that will be required are opened.

The LPA will meet with the team involved in the task to fill out the ILS checklist to determine what/ if logistics is impacted. The Logistics Department will provide a complete history of the Logistics products from their data bases.

If there is no logistics impact, the LPA will inform all concerned as to the disposition of the task.

If the ILS is impacted, the LPA will liaison with the Logistics Department and the ISEAs to obtain their estimates for completing the task. If an update is required, all deficient logistic data will be researched in an effort to clear all deficiencies.

Once all estimates are obtained, the LPA provides a single NSWCCD-SSES estimate to the originator.

If the estimate is accepted and dollars are available from the task initiator, funding is provided to all groups involved for logistics development or update. If funding is not available, the proposal is placed in a " Pending File" for future consideration.

The LPA is the sole source of coordination between the ISEAs and the Logistics Department. The LPAs will follow their implementation/responsibilities plan. Once all technical information is developed by the ISEAs, the LPA provides that information to the Logistics Department. The Logistics Department will follow its ISO 9001 procedures to produce the final product.

The Logistic Department is responsible for distributing the final logistic products, in the appropriate media, to all customers that require them.

NSWCCD-SSES PROGRAM MANAGEMENT

Introduction

The Life Cycle Model of the organization consists of several critical elements. The ability of the Directorate to execute its mission and maintain leadership in Machinery is based on the successful management of large programs. These programs support all aspects of our core equities and allow us to maintain our position as the Navy's Machinery engineering expert. Consequently, the role of the Program Manager (PM) and the program management process is critical to the success of the Directorate.

Program management is the process of working with and through other people and using appropriate resources to meet the specified program requirements within cost, on schedule, and at a performance level that satisfies the customer\sponsor. In executing program management, the Program Manager must effectively accomplish a number of management functions during the program's life cycle. These management functions include initiating, planning, executing, managing, and closing. Program management must first take into account diverse interests and points of view. Second, it facilitates tailoring the management system and techniques to the uniqueness of the program. Third, it represents integration of a complex system of differing but related functional discipline areas that must work together to achieve program goals.

Program Evaluation

At NSWCCD-SSES, programs enhance the Life Cycle Manager capabilities and effectiveness by managing programs that directly support their systems and equipment. These programs may vary in size and magnitude and cover all areas of support (engineering, logistics, T&E, etc) or be specific to one area. Programs may be either ISE or T&E. Programs can be of specific nature; they can be more continuing; or more general (R&D program). However, there are several basic similarities. For potential tasks to be designated as a NSWC-SSES program, they are evaluated to the following criteria:

1. **Risk**
   - Consequence of failure
   - Critical tie to SSES mission
   - High dollar amount / potential dollars
   - Relates to large acquisition program
   - Requires extensive use of SSES facilities
   - Technical complexity

2. **Visibility**
   - Level and desire of sponsor
   - Quantity of sponsors
   - Teaming with numerous outside activities (Government and private)
   - Reflection of Headquarters' programs

3. **Integration**
   - Involves multiple Directorates
   - Involves multiple Departments
   - Potentially involves Multiple Departments

When it has been determined that the criteria justifies a program, a Program Manager is assigned by the Directorate Head (Code 90). This begins the first stage of the process; initiating the program. It is the PM's responsibility to meet with the sponsor to establish the scope of the program. Based on the scope of the program, a SSES program team is assembled. A matrix approach is utilized in assembling this team. Although the PM is within Code 91, the Program Team is drawn from the various engineering and logistic codes within the organization, other organizations, shipbuilders, and Full Service contractors. The team will consist of life cycle management, logistics, engineering, acquisition, T&E, platform management, and contractors as required, depending on the scope of the program. This team is established to identify all required areas of support for the program.

The initial objective of the Program Team is to develop a POA&M for the program and receive funding from the sponsor. Once the schedule has been established, an Integrated Program Plan is developed and presented to the sponsor for concurrence. The plan should identify the tasking for each area of support, key milestones, and the method for integrating each of the areas into the final product. After receiving concurrence for the Program plan the actual Program Execution Team (PET) is established. The PET may consist of all members of the Program Team or just a portion of the Program Team depending on the scope of the program. It is the PM's responsibility to establish the Program Execution Team, task the team members and identify product requirements and deadlines.

Execution

Each of the Program Execution Team members executes the program within their area of expertise\responsibility with the PM providing coordination of the overall team for integration into the final product. The PET members are responsible to develop their portion of the product as defined in the Integrated Program Plan, being conscious of its integration into the overall product. The PET members are required to provide status to the PM, support Design Reviews, and identify any areas of concern or impacts to cost and schedule to the PM.

During the process, the team will conduct several design reviews as required. These reviews include System Design Review (SDR), Preliminary Design Review (PDR), Critical Design Review (CDR), and a Final Design Review. The SDR is conducted to evaluate the technical approach, the associated risks, and the engineering planning for the next phase of effort. The intent of PDR is to evaluate progress and technical adequacy of the top-level design and test approach. The purpose of CDR is to ensure the detail design satisfies program requirements and to assess risk areas. The FDR finalizes the design and test plan, and provides for sponsor approval prior to producing

the final product. In essence the intent of these reviews is twofold. The first is to review program progress at various stages to ensure program technical goals are being met on schedule and within cost. Second, the reviews provide a forum for all team members to present progress in each of their specific areas and ensure all areas are being integrated within the program.

Throughout the execution phase of the program the PM is continuously interfacing with the PET members, the Platform Manager, Life Cycle Manager, and sponsor through meetings and status reports to ensure all are aware of program issues, progress, and status. It is the PM's responsibility to coordinate the various design reviews, document design review results, and provide formal status reports to the Platform Manager and sponsor. The Final Design Review, at a minimum, is conducted with the sponsor for approval prior to producing the final product. This level of coordination and communication within the Program Execution Team and with the sponsor is essential to achieve the program goals within cost and schedule.

PM Responsibilities

The Program Manager should have the corporate perspective of the program, including in-depth knowledge of the interrelationships among the elements of the Life Cycle Model. The PM:

- Is a leader and a manager of the individuals executing the tasks, not primarily a task "doer."
- Understands the requirements, environmental factors, organizations, activities, constraints, risks, and motivations impacting the program.
- Knows and is capable of working within the established framework, managerial systems, and process that provide funding and other decisions for the program to proceed.
- Comprehends and puts to use the basic skills of management – planning, organizing, staffing, leading, and controlling – so people and systems harmonize to produce the desired results.
- Coordinates the work of contractors, consultants, in-house engineers and logisticians, contracting officers, and others, whether assigned directly to the program office or supporting it through some form of matrix arrangement.
- Builds support for the program and monitors reactions and perceptions which help or impede progress.
- Coordinates with the Platform Manager to ensure the program progress fully supports the platform's needs.
- Is the main point of contact for the Sponsor, providing status of technical progress, cost and schedule, and identifying any associated risks.

Essentially, the program manager is an extension of top management and exists to exercise top management control in certain important areas. Usually failure in the designated area would impede the strategy of the Directorate. Communication within the assigned team, between PM, team members and sponsor, is critical to the overall success of the program. Although the team members are responsible for the accomplishment of

their specific tasks, ultimately it is the communication within the team, identifying obstacles to technical progress and associated risks to cost and schedule that will determine the overall success of the program.

NSWCCD-SSES PLATFORM MANAGEMENT

Introduction

The Life Cycle Model of the organization consists of several critical elements. The ability of the Directorate to execute its mission and maintain leadership in Machinery is based on the successful interface with Platform Sponsors, the fleet, and our engineers. Efficient and effective Platform Management is critical to our life cycle model for machinery. Consequently, the role of Platform Manager and the platform management process is critical to the success of the Directorate allowing us to maintain machinery engineering expertise.

Platform Management is the process of interfacing our engineering and support codes with our platform sponsors. Their mission is to use appropriate resources to meet the specified requirements within cost, on schedule, and at a performance level that satisfies our customers. Three critical roles of the Platform Managers are to gather proposals, track products, and provide information.

Responsibilities

The Platform Manager is the Directorate's primary coordinator for the Program Objective Memorandum (POM) cycle. In addition the Platform Manager gathers and submits proposals for tasks requiring funding in the execution year or following year. The Platform Manager's POM and proposal management leads to platform sponsors funding specific tasks with expectation of timely, cost effective and high quality products. The Platform Manager utilizes a series of measurements for proposals and products, which are shared with other platform managers to generate engineering trends. These trends enable the Directorate Head and Department Heads to predict future product areas and allocate resources accordingly.

The proposal and product management function of the Platform Manager allow them to be the focal point for external customers relating to ship's platforms. The Platform Manager, after analyzing engineering trends, teams engineering and support codes with platform sponsors. The goal is to have platform sponsors realize product benefits and allocate resources to new products. Coupled with the interface to existing platform sponsors, the managers serve as the primary entry point for potential new customers.

The Platform Manager's strong customer relationship necessitates financial management as a primary aspect of their function. The role of proposal and product management includes the financial interface to platform sponsors. Organizational resources that support the Directorate's POM and proposal cycles are managed in the platform offices. The function of the Platform Manager is to accept funding, fund appropriate internal codes and manage products.

The final key area of Platform Management, which is also directly related to customers, is Information Management. The Platform Manager serves as the primary representative to external platform managers. Equally important is the managers' ability to supply platform information to our engineering and support codes. The Platform Manager's primary functions of POM management, customer cultivation, financial management and information management are multi dimensional.

POM Management

The Platform Manager will coordinate submitting proposals for both the POM cycle and current year tasking. It is their responsibility to meet with the sponsor and establish the scope of the support that will be provided. The Platform Manager will ensure the core equities of the organization are considered during each program cycle. Developing a format for proposals and collating and clarifying as necessary does this. The Platform Manager will present an assembled group of taskings prepared by the engineering and support codes. The Platform Manager sponsors a POM summit where Life Cycle Managers address details of their proposals. The Platform Manager is fully aware that the customers' focus is on product development and therefore tracks funded products. The Platform Managers use a standardized process to track both proposals and products. This process allows the various Platform Managers to identify engineering trends that effect our directorate.

Customer Cultivation

The Platform Manager will function as the primary interface for platform sponsors. By managing proposals and products and analyzing trends across platforms, the Program Manager serves as the interface between the LCM and Platform Sponsors. In addition the Platform Manager serves as the entry point for new customers. This will entail arranging overviews, briefings, and tours for the new customers, always with the intent of highlighting our core capabilities. Both parties' business expectations need to be discussed and explained fully.

Financial Management

The Platform Manager will receive, distribute, and track funding for the directorate when the funding pertains to a particular platform. This will include accepting the funding document after negotiating funding levels and type of funds. The Platform Manager will notify the engineering codes when funds are received, document the product being funded, issue funding as appropriate, track funding expenditures, and notify the codes when funding is exhausted. The Platform Manager will use standardized metrics so comparisons can be made between ship classes. These metrics will also be utilized to analyze product trends.

Information Management

The Platform Manager should have the full perspective with respect to current fleet issues. This is gained by daily interface to platform sponsors, including sorting and routing naval message traffic. The Platform Manager is also responsible for frequent interface with the customer, and will relay policy changes and feedback as required. The PM:

- Is a leader and a manager, not primarily a task "doer."
- Understands the requirements, environmental factors, organizations, activities, constraints, risks, and motivations impacting the assigned ship class.
- Knows and is capable of working within the established framework, managerial systems, and process that provide funding and other decisions for the platform to proceed.
- Comprehends and puts to use the basic skills of management – planning, organizing, staffing, leading, and controlling – so people and systems harmonize to produce the desired results.
- Interfaces with the fleet and is fully cognizant of their desires.
- Coordinates proposal management.
- Ensures timely, cost effective product completion.
- Is the primary financial interface for platform sponsors

Title: **LIFE CYCLE MANAGEMENT**	Procedure Number:	Revision Number: 0	Effective Date:
	Prepared By:	Approved By: Donald J. Collins	Page: 1 of 4

1.0 **Purpose:** To establish and maintain a standardized process for Life Cycle Management (LCM) in code 90.

1.1 **Scope:** This procedure applies to all codes within Directorate 90 with LCM responsibility.

1.2 **Responsibility:**

1.2.1 Life Cycle Management is responsible for improving system RM&A, reducing total ownership costs, reducing time for introducing new or enhanced capabilities into the fleet, and to further the integration of machinery into Battle Force and Battle Group

1.2.2 The code 90 Life Cycle Managers are responsible for the effective implementation of this process (Attachment 1.7.1) including but not limited to:

1.2.2.1 Prepare and execute system level LCM Master Plan.
1.2.2.2 Monitor and track ISE system performance data (metrics).
1.2.2.3 Conduct periodic working-group meetings to discuss LCM Master Plan status and major issues and priorities among LCM team.
1.2.2.4 Perform as the system expert by maintaining a knowledge base for all aspects of the system.
1.2.2.5 Interface with TYCOMs.
1.2.2.6 Submit system program planning and long-term funding requirements.
1.2.2.7 Ensure LCM Master Plan goals are met.

1.3 **Definitions:**

1.3.1 Life Cycle Management: The process that binds together Program Management, Ship Acquisition, Research and Development, In-Service Engineering, Test and Evaluation, and Logistics and links them to the world.

1.3.2 LCM Transition Plan: Document identifying the technical/program management requirements which must be assumed by the receiving organization as well as other considerations necessary to enable sufficient resource planning for a coordinated transfer of program activities.

1.3.3 LCM Master Plan: Document identifying the next five to seven year life cycle management requirements at the system level including prioritized fleet problems and associated solutions (i.e. Gas Turbine LCM Master Plan). The LCM Master Plan specifies the total workload/requirements for all applicable ship classes (cross-platform plan) including R&D, ISE, SSA, T&E, LCM, Ship Acquisition, Program Management and Installation/backfits.

1.4 Procedure:

1.4.1 This procedure conforms to DQP 00-0000-052-02.

1.4.2 Upon designation as Life Cycle Manager, a Memorandum of Agreement (MOA) between SSES and NAVSEA 03 will be issued defining the principles and goals governing the transfer of functions and personnel.

1.4.3 The Directorate Head or his designee will assign a Life Cycle Manager.

1.4.4 The LCM Team shall be formed consisting of the Life Cycle Manager and representatives from organizations that include but are not limited to the following:

1.4.4.1 NAVSEA
1.4.4.2 PEO
1.4.4.3 OPNAV
1.4.4.4 TYCOM
1.4.4.5 NAVICP
1.4.4.6 ISEA
1.4.4.7 CINC

1.4.5 The LCM and NAVSEA 03 representative prepare a draft LCM Transition Plan. Development of this plan will be in accordance with the Transition Planning Checklist (Attachment 1.7.2) and Program Transition Plan Strawman (Attachment 1.7.3).

1.4.6 Code 90 LCMs meet and discuss the draft LCM plans.

1.4.7 The LCM Transition Plan is then signed and approved by NAVSEA 03 and Code 90 representatives.

1.4.8 Transition of Life Cycle Management commences. A period of 6 months shall be the maximum for transition.

1.4.9 Life Cycle Managers will prepare system level five to seven year LCM Master Plans containing the following (see sample outline for a LCM Master Plan attachment 1.7.4):

1.4.9.1 Specific long term goals and the method to achieve and monitor them (i.e. RM&A).
1.4.9.2 Prioritized top current fleet problems including the supporting data, root

cause and solutions.

1.4.9.3 A POA&M to resolve the above issues.

1.4.9.4 Projected workload for all programs involved included in a LCM Work Breakdown Structure (WBS) (Attachment 1.7.5).

1.4.9.5 Funding requirements including but not limited to a fleet status matrix (Attachment 1.7.6) and breakout by WBS.

1.4.10 The completed LCM Master Plan is submitted and approved by NAVSEA 03 and code 90 representatives.

1.4.11 Upon approval, the LCM Master Plan detailing LCM requirements is submitted to the sponsor(s) for approval and funding.

1.4.12 The LCM Team executes the LCM Master Plan:

1.4.12.1 Assign yearly tasking in accordance with WBS.

1.4.12.2 Conduct periodic team meetings to discuss LCM Master Plan status.

1.4.12.3 Continuously assess metrics and ensure customer needs are met (including but not limited to tasking accomplished in accordance with WBS.)

1.4.13 The LCM Master Plan will be reviewed, updated, and resubmitted annually.

1.5 **References:**

1.5.1 Division Quality Procedure 00-000-092-01, Process Control.

1.6 **Records:**

1.6.1 MOA

1.6.2 Program Transition Planning Checklist

1.6.3 Program Transition Plan

1.6.4 LCM Master Plan and WBS

1.6.5 Status Reports (as required by 1.6.3 & 1.6.4)

1.6.6 Metrics Report

1.7 **Attachments: (not included see note below)**

1.7.1 Life Cycle Management Process Flow Chart

1.7.2 Program Transition Planning Checklist

1.7.3 Program Transition Plan Strawman

1.7.4 Sample LCM Master Plan Outline

1.7.5 Sample LCM Work Breakdown Structure (WBS)

1.7.6 Sample Fleet Population Matrix

Note: Attachments are being finalized and have not been included in this presentation.

DATA ANALYSIS/MANAGEMENT PROCEDURE

1.0 Description of Work
This instruction describes the procedure used for the management and analysis of engineering data within the Machinery Engineering Directorate as part of the overall In-Service Engineering Process.

2.0 References:
- 2.1 NAVSEAINST 5400.57B (Draft), NAVSEA Instructions For Technical Authority.
- 2.2 OPNAVINST 3000.2

3.0 List of Pages Effected by Change (LOPE)
None

4.0 Material/Equipment
None

5.0 Appendices
- A. Directorate 90 In-Service Engineering Process Map
- B. Description of key Fleet equipment performance metrics
- C. Return On Investment development

6.0 Sequence of Operations
- 6.1 Access appropriate databases to record HM&E Configuration data:
  - 6.1.1 Equipment installation by Hull Number
  - 6.1.2 Alteration Records
  - 6.1.3 Allowance Parts List (APL)
  - 6.1.4 Planned Maintenance System (PMS)
  - 6.1.5 Engineering Operating Sequencing System (EOSS) (if Applicable)
  - 6.1.6 Technical Manual
  - 6.1.7 Technical Repair Standards (TRS) (if applicable)
  - 6.1.8 Intermediate Maintenance Standards (IMS) (if applicable)
  - 6.1.9 Training Material (Videos, CDROMs, etc.. if applicable)
- 6.2 Determine appropriate performance indicators (Appendix A).
- 6.3 Update performance indicators using current Fleet data.
- 6.4 Receive input from:
  - 6.4.1 3M
  - 6.4.2 ICAS
  - 6.4.3 Reports
  - 6.4.4 Naval Messages
  - 6.4.5 T&E process
  - 6.4.6 R&D process
  - 6.4.7 Fleet feedback

6.5 Use appropriate statistical analysis tools, as necessary, to convert raw data into information needed to conduct engineering analysis (Reference 2.2).
6.6 Identify problems/requirements.
6.7 Feed results of analysis to the Maintenance Engineering and Design Engineering Sub-processes for assessment and determination of root causes.
6.8 Receive input from the Maintenance Engineering and Design Engineering Sub-processes.
6.9 Select Optimal solution using:
    6.9.1 Data analysis
    6.9.2 Return On Investment (Appendix B)
6.10 Determine if a change to the hardware and/or ILS is required
    6.10.1 If no change is required, end process
    6.10.2 If a change is required send output to the Maintenance engineering sub-process for determination of what, if any, changes are required to maintenance procedures.
6.11 Receive input from the Installation engineering process and update configuration as necessary.

MAINTENANCE ENGINEERING PROCEDURE

1.0 Description of Work:
Establish procedures for accomplishing Maintenance engineering efforts within the Machinery In-Service Engineering Directorate.

2.0 References:
2.1 NAVSEAINST 5400.57B - Draft ISEA INST
2.2 OPNAVINST 4790.4C – Ship's Maintenance and Material Management System (3-M) Manual
2.3 NAVSEAINST 4790.8A – Policy and Assignment of Responsibilities for the Planned Maintenance System (PMS)
2.4 OPNAVINST 9200.3 - Engineering Operational Sequencing System
2.5 NAVSEAINST 4790.7B – Operational Sequencing Systems (OSS)
2.6 NAVSEAINST 4160.3A – Technical Manual Management Program
2.7 SPCCINST 4441.170A – COSAL Use and Maintenance Manual
2.8 OPNAVINST 1500 – Navy Training Planning Process
2.9 OPNAVINST P-111-1-186 Navy Training Plan Manual

3.0 List of Pages Affected by Change:
None

4.0 Material/Equipment:
None

5.0 Appendices:
A. In Service Engineering Process Map

6.0 Sequence of Events

6.1 Maintenance Engineering begins with input from Data Analysis Problem / Requirement Identification.

6.2 Review and assess the following products for their potential for being part of the identified problem:

6.2.1. Technical Documentation -Review the following documentation to determine if it is it available, current, correct, applicable:
6.2.1.1 TM
6.2.1.2. PMS
6.2.1.3. I & D – Level Repair Procedures (IMMPs, TRSs, etc.)
6.2.1.4. OEM Data

6.2.2 Supply Documentation
6.2.2.1 APL – Review for the correct parts breakdown.
6.2.2.2 On-Board Spares – Review to see if they are sufficient/appropriate.

6.2.3 Training – Review to determine it is technically correct, at the appropriate level.

6.2.4 Manning – Review to determine whether the correct ratings / talent levels being used.

6.2.5 Maintenance

6.2.5.1. Review to determine if the Maintenance Philosophy is correct and at the appropriate level, interval and frequency.

6.2.5.2. Review to determine whether appropriate resources being used. Determine whether Contractors / shipbuilders have appropriate capability and capacity.

6.3 Maintenance Assessment is provided as input to Design Engineering for further use in Design Assessment.

6.4 Maintenance Engineering is initiated upon input from Installation Engineering when Alteration Documentation / Installation Design has been reviewed / developed.

6.5 Assess the requirement for revision of the following products as a result of implementing the new design / alteration:

6.5.1. Technical Documentation
6.5.2. Supply Documentation
6.5.3. Training Documentation
6.5.4. Manning Documentation
6.5.5. Maintenance Documentation

6.6. Any change requirements identified in the assessment are documented and forwarded to responsible external process owners for implementation

DESIGN ENGINEERING PROCEDURE

1.0 Description of Work:
Establish procedures for accomplishing design engineering efforts within the Machinery Engineering Directorate as part of the overall In Service Engineering Process. .

2.0 References:
2.1. NAVSEAINST 5400.57B (Draft), NAVSEA Instructions For Technical Authority
2.2. NAVSEA S9AA0-AA-SPN-010, "General Specifications for Ships of the United States Navy"
2.3. NAVSEA S9086-KC-STM-010, "Navy Ships Technical Manual"
2.4. NAVSEA T9300-AF-PRO-020, "NAVSEA Design Practice and Criteria Manual"
2.5. MIL-STD-810, "Environmental Test Methods and Engineering Guidelines"
2.6. MIL-STD-882, "System Safety Program Requirements"
2.7. Ship Specifications (for individual ship class design)

3.0 List of Pages Affected by Change:
None

4.0 Material/Equipment:
None

5.0 Appendices:
A. Directorate 90 In-Service Engineering Process Map

6.0 Sequence of Operations:
6.1. Engineering Input
6.1.1. Data Analysis and Problem Identification - Data can be obtained in a variety of formats and from a variety of sources. Principally, data will be obtained via 3M, CASREP or other Naval Messages or technical reports.
6.1.2. Maintenance Engineering Assessment – A problem or potential improvement, identified via data, Naval Message, technical report or other source, would be assessed for possible design changes after the Maintenance Engineering Assessment.
6.2. Accomplish Engineering Assessment of current Design:
Using data/information from the Analysis sub-process and other sources as required, assess the following: safety requirements, reliability, ownership cost, ability to meet operational requirements, maintainability, availability, obsolescence, logistics support, producibility, system impacts, and other

factors, as required. Assessment may require testing or modeling and simulation.

6.3. If analysis indicates design change is required as part of Optimal Solution, propose engineering design change,

6.3.1. Generate engineering change proposal.

6.3.2. Forward engineering change proposal to the Life Cycle Manager (LCM) for approval and processing, if required.

6.3.3. Develop design change

6.3.3.1. Once approval is obtained, develop engineering change.

6.3.3.2. Or, receive task from customer/external process or other source requesting design change development.

6.3.4. Prepare design change document.

6.3.4.1. Determine required resources, materials, equipment and personnel to accomplish design change.

6.3.4.2. Establish plan of actions and milestones to accomplish design change.

6.3.5. Determine impacts to other systems and establish technical interfaces, as required.

6.3.5.1. Provide any required reports or communications to other external processes.

6.3.6. Accomplish Design Change Verification, by one or more of the following methods:

6.3.6.1. Perform alternate calculations

6.3.6.2. Compare new design with a similar proven design, if available.

6.3.6.3. If testing is required, follow T&E Process

6.3.7. Provide design change in appropriate documentation format (e.g. Specification, Standard, ShipAlt Record, ECP, MACHALT, AER, etc.) to LCM for approval, if required.

6.3.8. Provide support to review configuration changes (CCB, CRB, IRAT), as required.

6.3.9. Revise design, if required, based on inputs from the LCM, CC/RB or other source.

6.3.10. Revise Design Change, as required, based upon results from alteration accomplishment.

INSTALLATION ENGINEERING PROCEDURE

1.0 Description of Work:
Establish procedures for accomplishing Installation Engineering within the Machinery Engineering Directorate as part of the overall In-Service Engineering Process.

2.0 References:

2.1 NAVSSESINST 4720.2C

2.2 Technical Specification 9090-100 – SHIPALT Technical Liaison Services, Waivers, and Deviations

2.3 Technical Specification 9090-310B – Alterations to Ships Accomplished by Alteration Installation Teams

2.4 Technical Specification 9090-600 – Ship Alteration (SHIPALT) Installation Drawing (SID) Preparation

2.5 Technical Specification 9090-700 – Ship Configuration and Logistics Support Information System (SCLSIS)

2.6 NAVSEA 0902-018-2010 – General Overhaul Specifications for Deep Diving Submarines

2.7 NAVSEA 0924-062-0010 – Submarine Material Certification Requirements Manual for Submarine Safety Program

2.8 NAVSEA S9040-AA-GTP-010/SSCR – Shipboard Systems Certification Requirements for Surface Ship Industrial Periods (Non-Nuclear)

2.9 NAVSEA S9070-AA-MME-010/SSN/SSBN – Guidance Manual for Temporary Submarine Alterations

2.10 NAVSEA S9AAO-AA-SPN-010/GEN-SPEC – General Specifications for Ships of the U.S. Navy

2.11 NAVSEA S9AAO-AB-GOS-010/GSO – General Specification for Overhaul of Surface Ships

2.12 NAVSEA SL720-AA-MAN-010/020 – Fleet Modernization Program Management and Operations Manual (Volumes 1 & 2)

2.13 NAVSEA T9066-AA-MAN-010 – Navy Outfitting Program Policy and Procedures Manual

2.14 NAVSEAINST 5400.57B (Draft), NAVSEA Instructions for Technical Authority

2.15 CINCLANTFLT/CINCLPACFLTINST 4790.3 – JOINT FLEET MAINTENANCE MANUAL

2.16 CARDEROCK DIV INST 4855.4 SUBSAFE/LEVEL 1 Requirements Manual (Non-Nuclear)

2.17 NAVSEA T9410-BU-PRO-010/MOD SOP – Trident Command and Control System Modification Development Standard Operating Procedure Rev A 1 Mar 1992

3.0 List of Pages Affected by Change:
None

4.0 Material/Equipment:
None

5.0 Appendix:
A. Directorate 90 In-Service Engineering Process Map

6.0 Sequence of Operations:

6.1 Installation Engineering Sub-Process commences with:
- 6.1.1 A task from a customer or from an external process
- 6.1.2 An approved alteration document from an external source

6.2 Develop, review alteration documentation or installation design following the applicable INSTS/SPECs under 2.0.

6.3 Assess the impact of the installation design components through the Maintenance Engineering Sub-Process.

6.4 Determine Installation Requirements as follows:
- 6.4.1 Prior to installation, a determination needs to be made on the following: Installation Support, Prototype, Installation Review, On Sight Technical Oversight and Testing.

6.5 Determine Testing Requirements
- 6.5.1 If testing is required follow T&E Process.

6.6 Review Alteration Installation
- 6.6.1 Alteration is installed as designed
  - 6.6.1.1 Certify Alteration and update Configuration through the Data Analysis/Management Sub-Process
- 6.6.2 Alteration has deficiencies as follows:
  - 6.6.2.1 Documentation is incorrect and revisions are accomplished by repeating steps 6.2 and 6.3 of Installation Engineering Sub-Process
  - 6.6.2.2 Design deficiencies are discovered during Alteration Installation and are corrected as follows:
    - 6.6.2.2.1 Accomplish Engineering Assessment of current design by proceeding to step 6.2 of the Design Engineering Sub-Process

Title: **Integrated ILS Process**	Procedure Number: 00-9400-093-01	Revision Number: 0	Effective Date: 2/1/99
	Prepared By: F. Ciocciola	Approved By: M. Cohen	Page: 1 of 2

9.0 Purpose

The purpose of this procedure is to identify the process that integrates all ILS elements.

9.1 Scope

This work instruction applies to all logistic elements in Codes 942, 943, 944 and 945.

9.2 Responsibility

The Branch Managers of Codes 942, 943, 944 and 945, or their designees are responsible for the maintenance, update and management of this procedure.

9.3 Definitions

None

9.4 Procedure

9.4.1 Upon receipt of each feedback, alteration, advisory, ECP, training development /deficiency or other programmatic configuration change, the designated Branch receipt control point shall evaluate for ILS impact in accordance with the existing Branch ISO procedures.

9.4.2 If the evaluation of other ILS products DOES NOT indicate impact to other logistic products, complete the initial task IAW existing ISO procedures.

9.4.3 If the evaluation of other ILS products DOES indicate impact to other logistic products, advise the sponsor and other ILS agents of the need and cost involved.

9.4.4 If funding IS available to update the other logistic products impacted by the impending change, complete the changes IAW the appropriate existing ISO procedures.

9.4.5 If funding IS NOT available to update the other logistic products impacted by the impending change, maintain a record of the need for change, advise the sponsor and other ILS agent of the requirement to update and request funding to complete the task.

9.5 References

9.5.1 ISO Procedures for PMS, OSS, Technical Manuals, Training and Supply Support as follows:

9.5.1.1	00-9421-093-01	Routine PMS Feedback Review Process
9.5.1.2	00-9421-093-02	Urgent PMS Feedback Review Process
9.5.1.3	00-9422-093-01	PMS Special Projects
9.5.1.4	00-9422-093-03	Engineering Procedure Changes for Alterations
9.5.1.5	00-9430-093-02	Updates for Authorized Alterations
9.5.1.6	00-9430-093-03	Cat "B" Feedbacks
9.5.1.7	00-9440-093-02	HM&E TM Development/Changes/Revision
9.5.1.8	00-9440-093-03	Technical Feedbacks
9.5.1.9	00-9444-093-01	Curriculum Development
9.5.1.10	00-9444-093-02	Navy Training Plan/System Plan Development
9.5.1.11	00-9444-093-03	Interactive Courseware Development
9.5.1.12	00-9444-093-04	Navy Training Plan/System Plan Development-Prog Mgmt
9.5.1.13	00-9453-093-01	APL Update Process

9.6 Records

None

9.7 Attachments

None

Title: **PROGRAM MANAGEMENT**	Procedure Number: 00-9000-093-01	Revision Number: 0	Effective Date:
	Prepared By: Code 90 PM Core Team (TL=G. Ward)	Approved By: Donald J. Collins	Page: 1 of 3

9.0 Purpose: To establish and maintain a process for Program Management.

9.1 Scope: This procedure applies to all Codes within Directorate 90 in the Division Management System.

9.2 Responsibility:

9.2.1 The Code 90 Department Heads are responsible for the effective implementation of this process.

9.2.2 The Code 90 Branch Heads, Section Heads and Program Managers are responsible to carry out the process contained in this procedure.

9.3 Definitions:

9.3.1 Program Manager: An individual who carries out the duties outlined in the NAVSSES "Strategy for a Growing Organization" circa 1983.

9.4 Procedure:

9.4.1 This procedure conforms to DQP 00-0000-092-01.

9.4.2 Upon notification of the possibility of a proposed program, the Directorate Head or his designee determines the approximate scope of the inquiry and assesses if it qualifies as a program by considering the factors of risk, visibility and integration.

9.4.3 The Directorate Head or his designee designates a Program Manager.

9.4.4 The Program Manager contacts the Sponsor to receive direction/tasking.

9.4.5 The Program Manager assembles the Program Team consisting of the following as required:

9.4.5.1 Life Cycle Manager

9.4.5.2 Logistics Rep

9.4.5.3 Engineering Code Rep(s)

9.4.5.4 Acquisition Rep

9.4.5.5 Contractor(s)

9.4.5.6 Test & Evaluation Rep

9.4.6 The Program Team develops and presents to the Sponsor a Plan of Action and Milestones (POA&M) which outlines the plan for executing the Program.

9.4.7 Upon receipt of funding, the Program Team establishes and presents to the Sponsor an integrated, detailed Program Plan.

9.4.8 Upon acceptance of the detailed Program Plan by the Sponsor, the Program Manager establishes the Program Execution Team consisting of the same type of representatives as step 9.4.5 as may be required.

9.4.9 The Program Execution Team is assigned their tasks of the Program Plan and their product deadlines.

9.4.10 The Program Execution Team members accomplish their tasks and deliver their products.

9.4.11 The Program Manager tracks and coordinates all tasks of the Program Plan and provides status reports as per the agreements made with the Sponsor and as set forth in the Program Plan.

9.4.12 The Program Manager schedules and conducts all design reviews, including system, preliminary, critical and final design reviews.

9.4.13 The Program Manager finishes the Program by submitting the final product to the Sponsor. The Program is considered completed when the Sponsor confirms that the Program requirements have been fulfilled.

9.5 References:

9.5.1 Division Quality Procedure 00-000-092-01, Process Control.

9.6 Records:

9.6.1. Program POA&M

9.6.2 Program Plan

9.6.3 Status Reports (as required by 9.6.1 & 9.6.2)

9.6.4 Final product

9.7 Attachments:

None

Title: **PLATFORM MANAGEMENT**	Procedure Number: 00-9000-093-02	Revision Number: 0	Effective Date:
	Prepared By: Code 90 PM Core Team (TL=G. Ward)	Approved By: Donald J. Collins	Page: 1 of 3

9.0 Purpose: To establish and maintain a process for Platform Management.

9.1 Scope: This procedure applies to all Codes within Directorate 90 in the Division Management System.

9.2 Responsibility:

9.2.1 The Code 90 Department Heads are responsible for the effective implementation of this process.

9.2.2 The Code 90 Branch Heads, Section Heads and Platform Managers are responsible to carry out the process contained in this procedure.

9.3 Definitions:

9.3.1 Platform: Ship Type (e.g. aircraft carriers).

9.4 Procedure:

9.4.1 This procedure conforms to DQP 00-0000-092-01.

9.4.2 The Platform Manager issues a data call to Engineering Codes and Program Managers for Proposals, requiring that the proposals be in a standard task format.

9.4.3 If the feedback is for an outyear plan, the following is accomplished:

9.4.3.1 The Platform Manager consolidates outyear requirements and submits them to OPNAV via NAVSEA.

9.4.3.2 The results are incorporated into the Green/Yellow/Red Proposal Chart.

9.4.3.3 The Platform Manager meets with the Sponsor to select "Hot" topics.

9.4.3.4 The Sponsor visits Directorate 90 for POM Summit (Optional)

9.4.3.5 If the Sponsor does not fund topics immediately, he submits them to OPNAV. If OPNAV does not fund, the Green/Yellow/Red Proposal Chart is updated and the process ends for the particular FY.

9.4.4 If the feedback is for execution in the current fiscal year or the next fiscal year, the following is accomplished (Note that this step made be initiated through analyses of message traffic).

9.4.4.1 The Platform Manager meets with the Sponsor for input on critical issues.

9.4.4.2 The yearly proposals are reviewed against the critical issues and the appropriate ones are submitted.

9.4.4.3 The Green/Yellow/Red Proposal Chart is updated. The process ends here if the Sponsor does not fund.

9.4.5 If the Sponsor funds or funds are received from OPNAV, the products are identified (e.g. alteration, LCM, SERV, or Ship board Industrial Work), the Green/Yellow/Red Chart is updated and the Information Management steps are accomplished for each task.

9.4.6 The Platform Manager accomplishes the following:

9.4.6.1 Monitors/tracks expenditures.

9.4.6.2 Makes quarterly comparisons of products verses proposals.

9.4.6.3 Informs Engineering codes of trends and concerns.

9.4.6.4 Gathers and presents information for the Sponsor.

9.4.6.5 Issues reports quarterly unless more stringent requirements are deemed necessary by the Sponsor.

9.4.7 The Platform Manager may determine that a new customer exists and will generate interest as follows:

9.4.7.1 Set up interface with Engineering codes through tours and/or briefings.

9.4.7.2 If a Navy Customer, discuss expectations and present to the Engineering Codes for proposal generation (Step 9.4.4).

9.4.7.3 If not a Navy Customer, proceed to Step 9.4.2.

9.5 References:

9.5.1 Division Quality Procedure 00-000-092-01, Process Control.

9.6 Records:

9.6.1. Platform Outyear Plan

9.6.2 Platform Yearly Proposals

9.6.3 Updated Green/Yellow/Red Proposal Chart

9.6.4 Quarterly Platform Comparisons

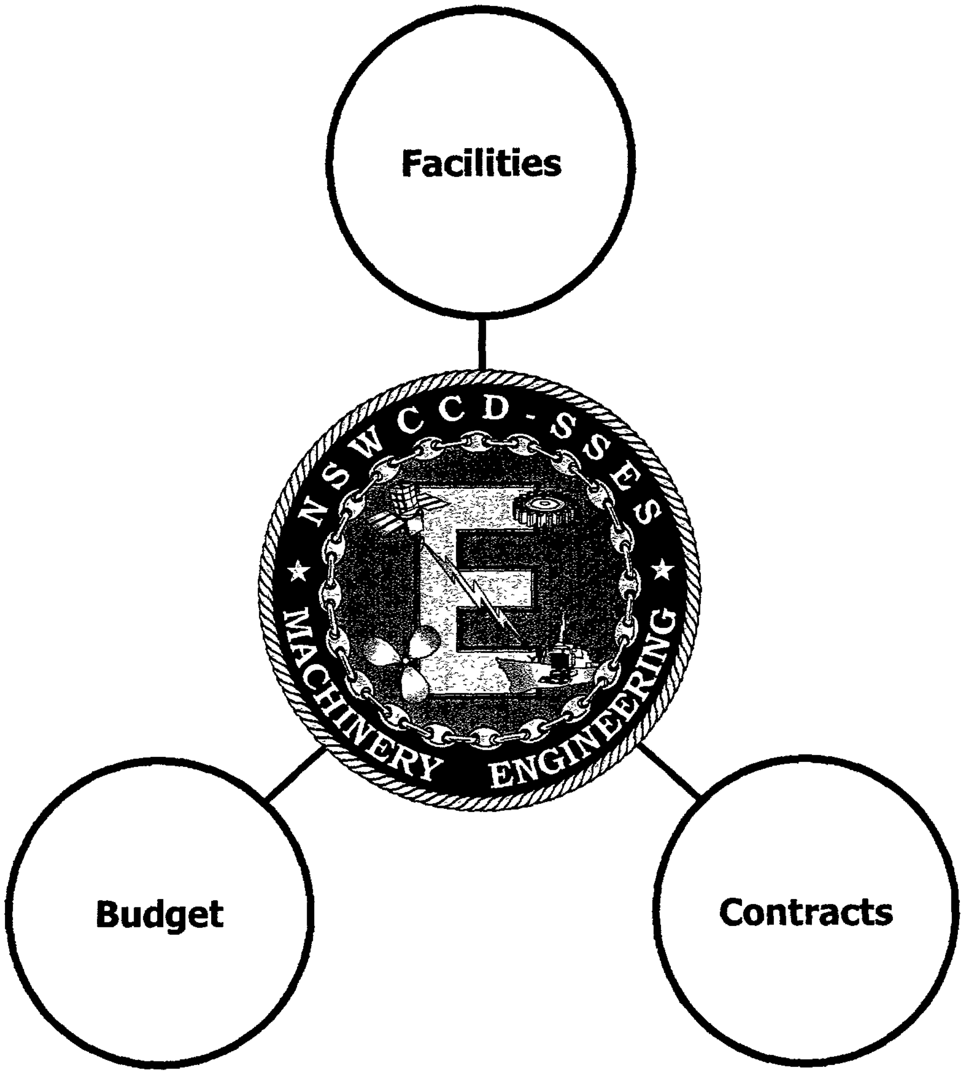
9.6.5 Quarterly Trends and Concerns

9.6.6 Quarterly Status Reports to Sponsor

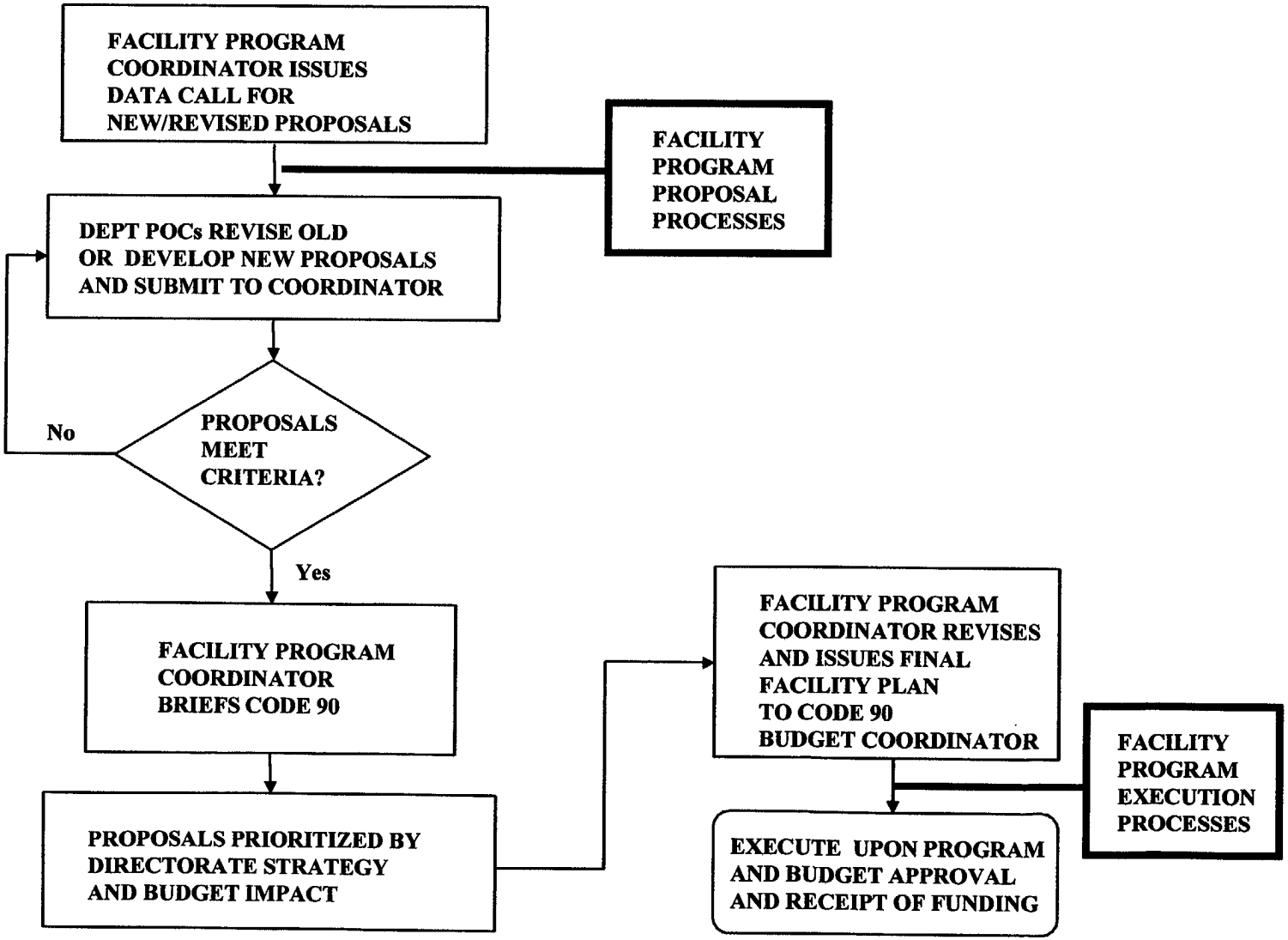
9.7 Attachments:

None

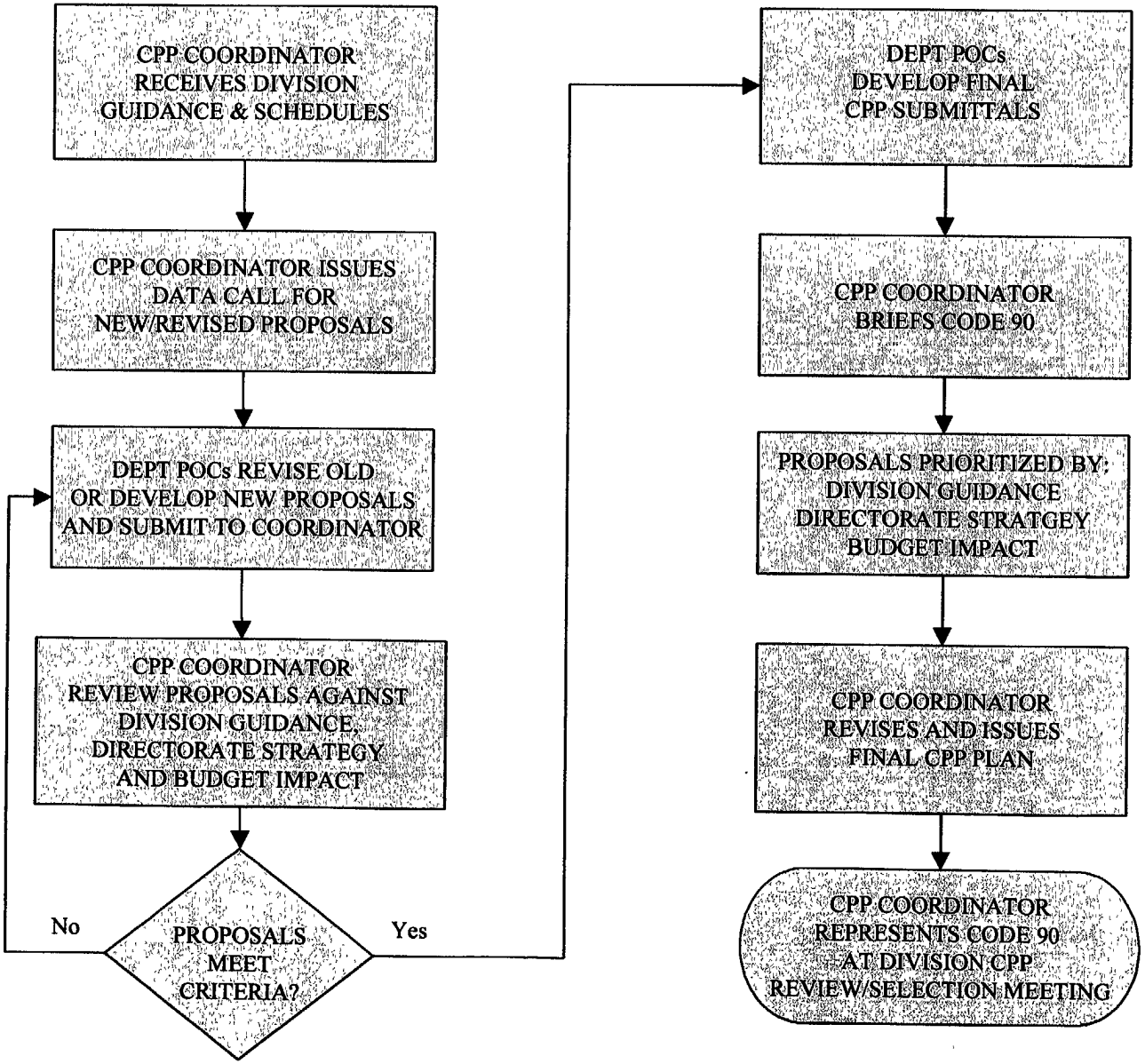
Business Model for Machinery



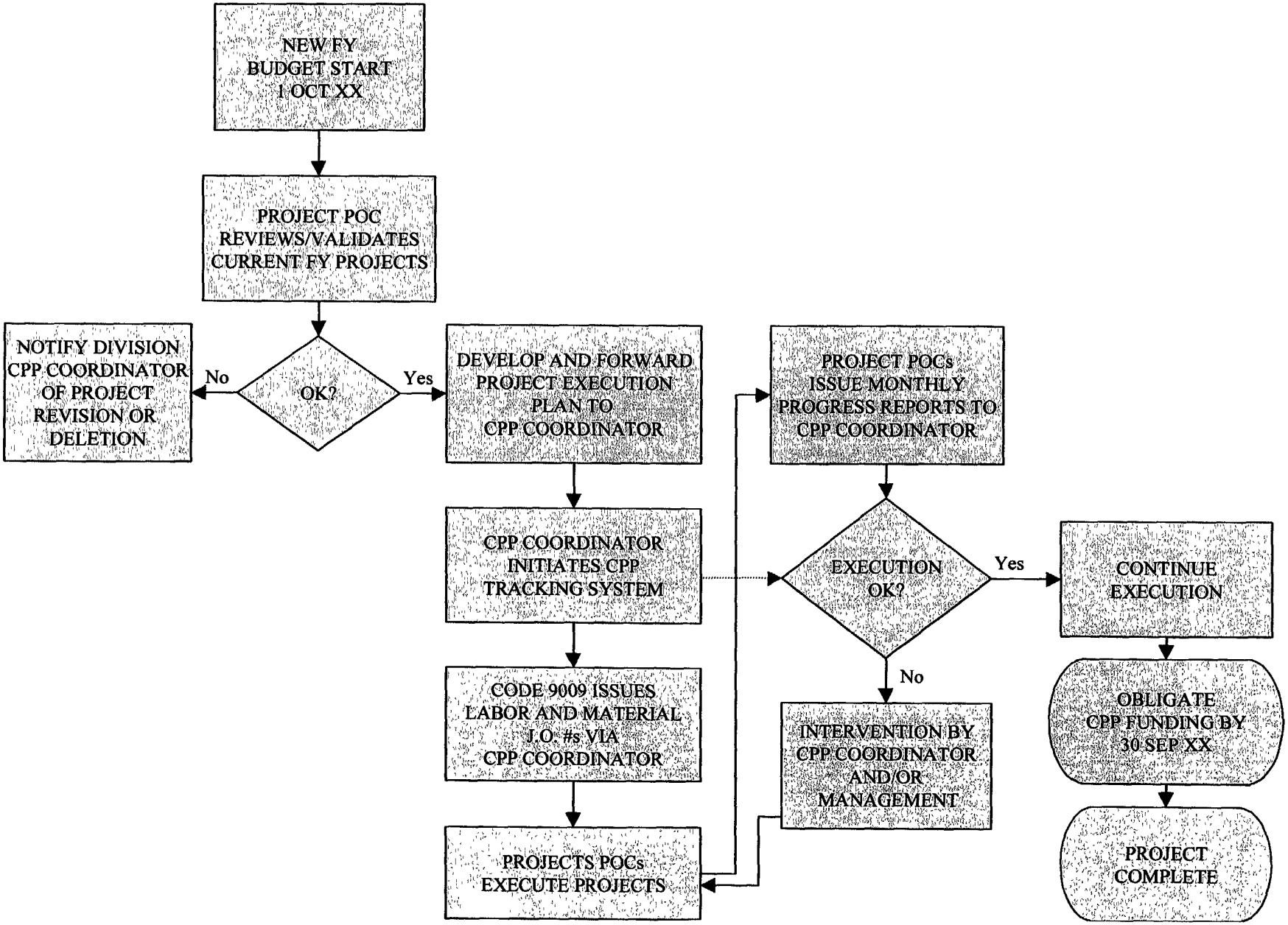
NSWC
Naval Surface Warfare Center
CARDEROCK DIVISION
PHILADELPHIA
An Activity of Naval Sea Systems Command



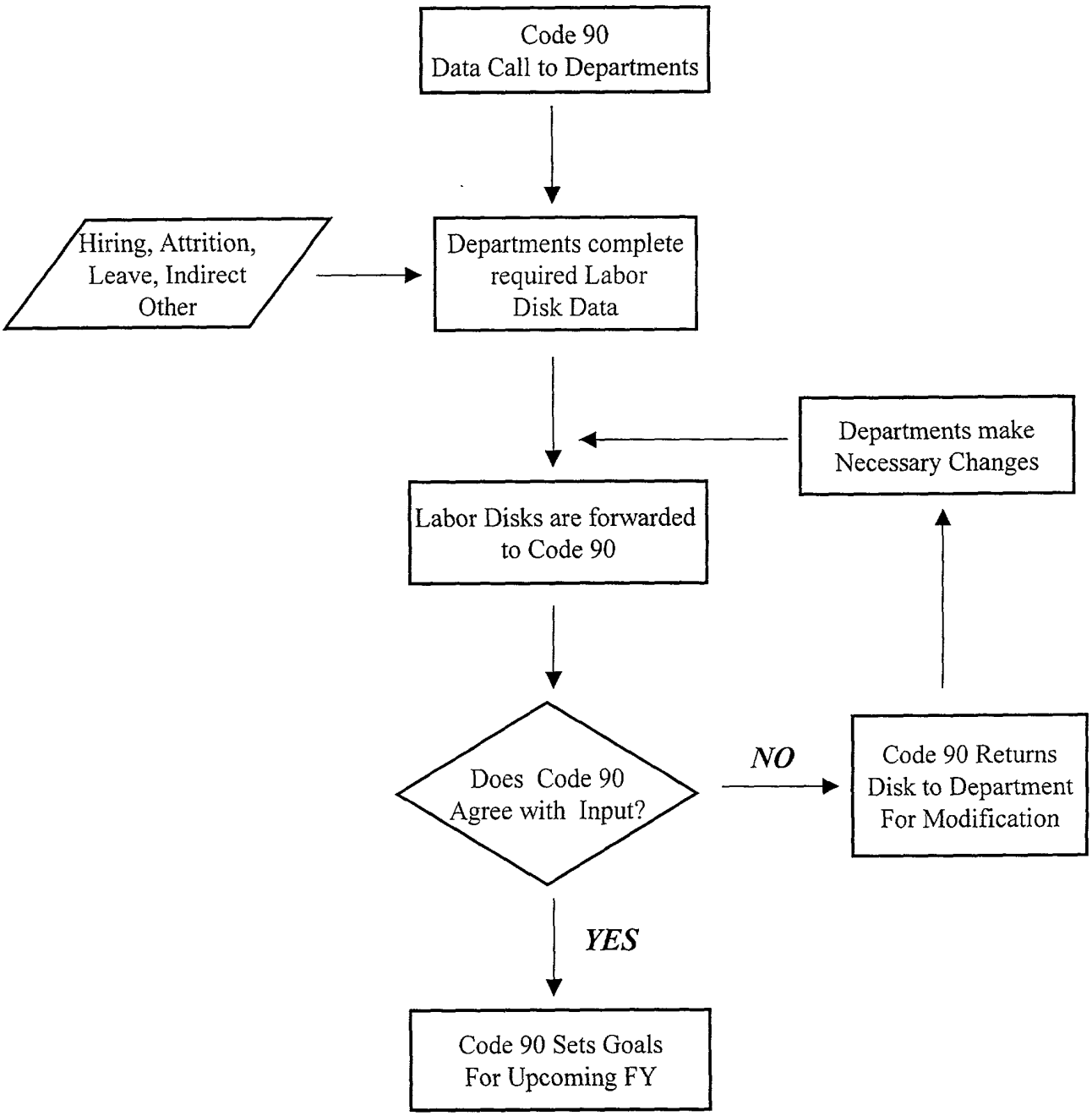
CAPITAL PROCUREMENT PROGRAM (PROPOSALS)



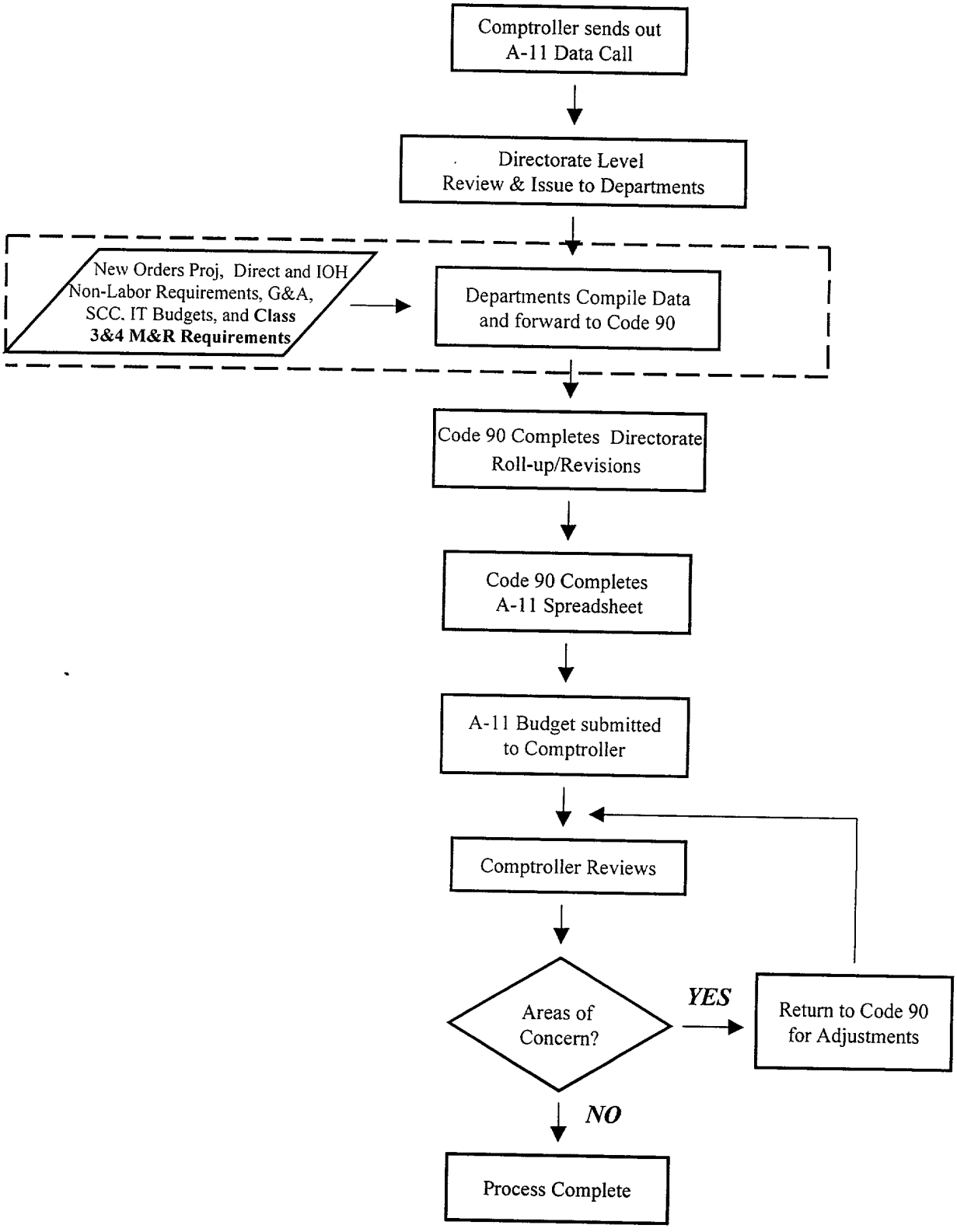
CAPITAL PROCUREMENT PROGRAM (EXECUTION)



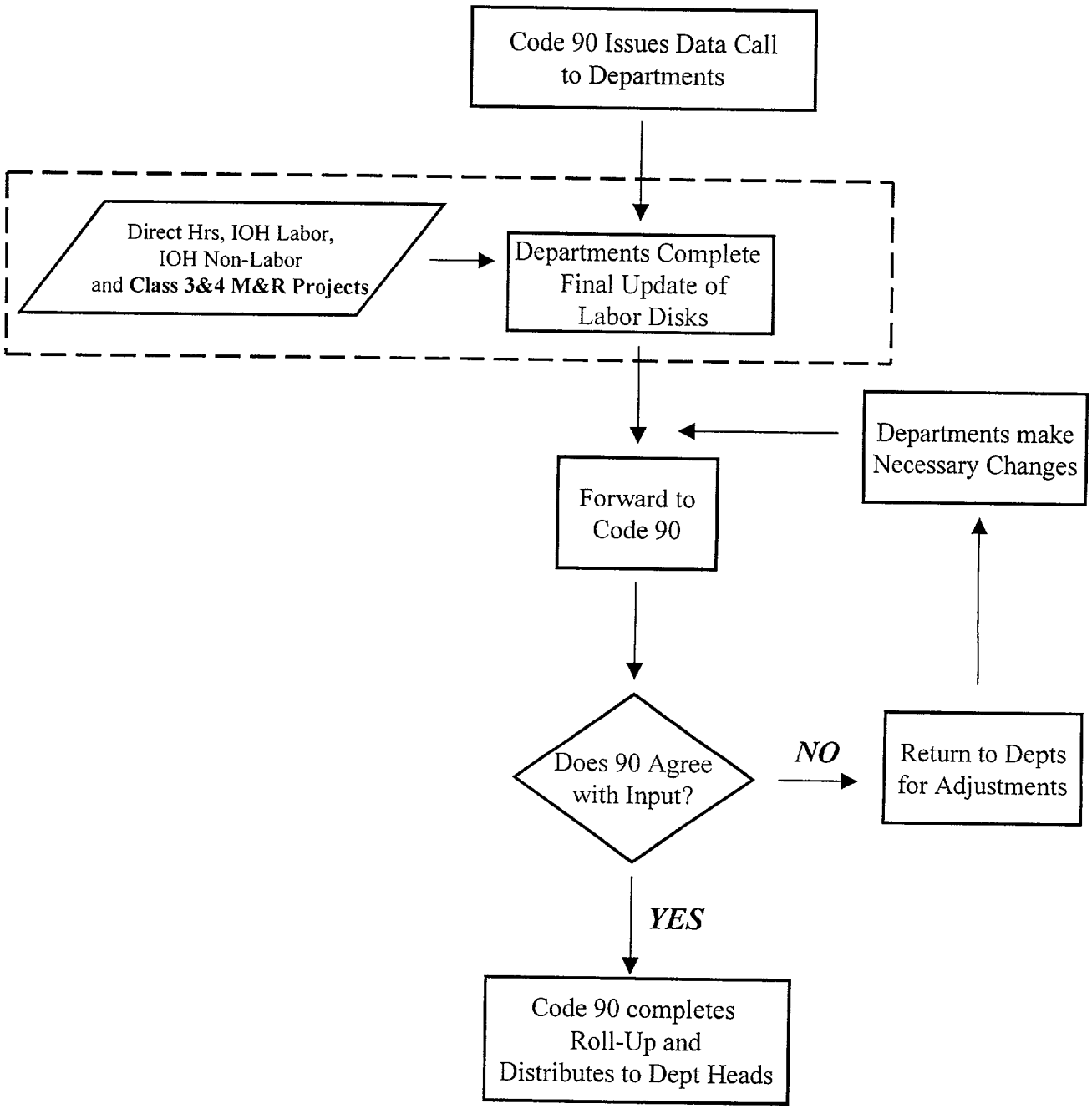
LABOR DISK PROCESS



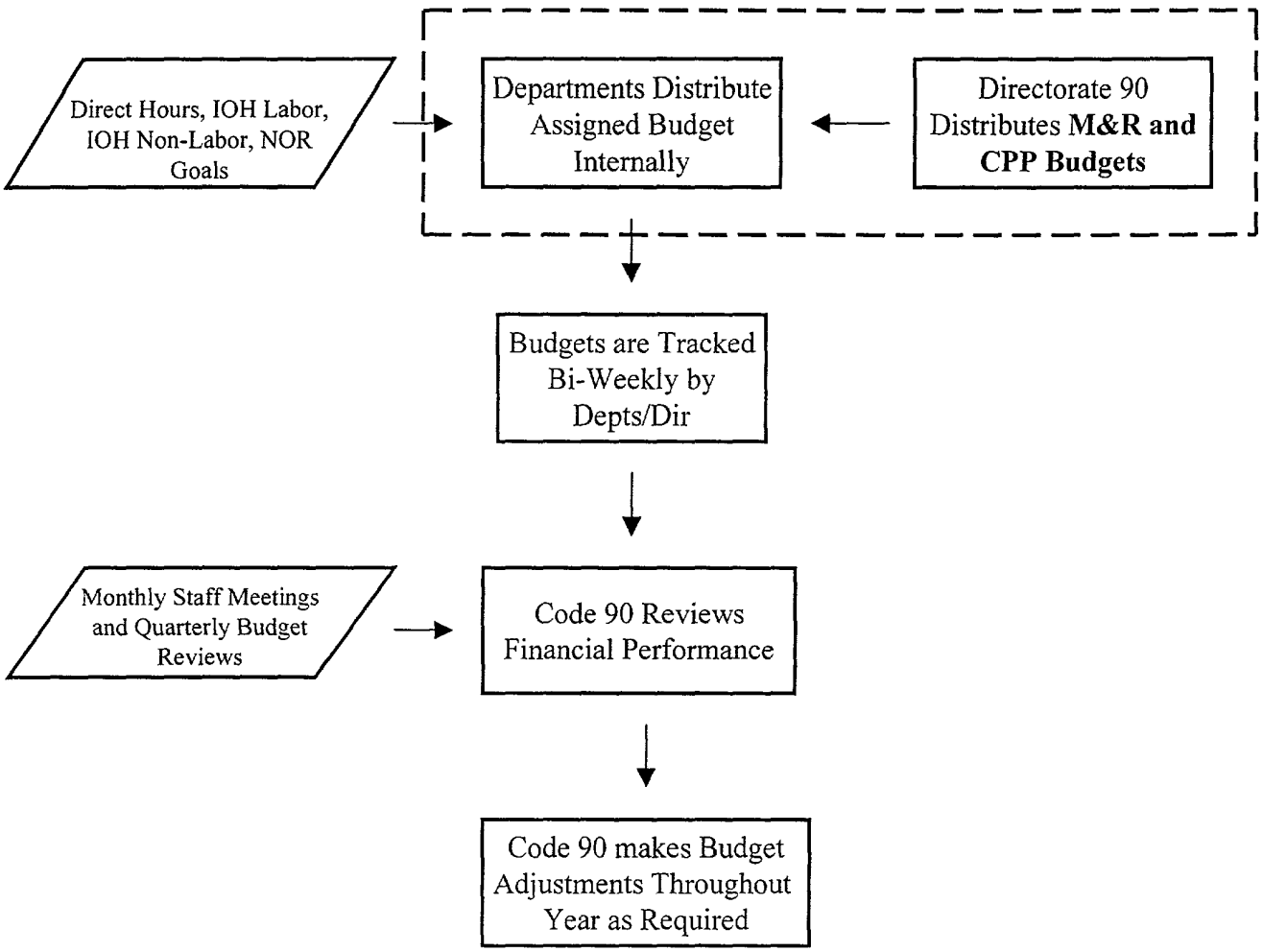
A-11 Budget Process



OPERATING BUDGET PROCESS



BUDGET EXECUTION PROCESS



FACILITIES PROCESS DESCRIPTION

Maintenance and Repair Program (Class 1 & 2)

The Navy Maintenance and Repair Program is the stewardship of the Command's Class 1, Land and Class 2, Buildings and Structures, assets to support the Command mission. The MRP program addresses asset condition rather than quantity. The process employed is:

- Deficiency identification (through a cyclic annual inspection of our facilities, through feedback from our dynamic equipment maintenance programs, and from the end users of our facilities to our help desk and in response to a yearly data call).
- Planning and Programming methods to correct deficiencies
- Budgeting (first from site perspective, then from Division perspective). Dollars budgeted are part of Overhead generated from the Division's revenues.
- Executing corrective maintenance and repair actions, both recurring in nature and specific "project" actions.
- Report and Analyze – budget execution and current snapshot of our asset conditions internally and externally.

Condition
Externally: NAVSEA via AIS report and BASEREP report
Internally: Via Facilities Board

Budget Execution
Externally: NAVSEA via MRP budget submit
Internally: Via Executive Finance Committee

Maintenance and Repair Program (Class 3 & 4)

Class 3: Test Sites
Class 4: Equipment

Class 3 and 4 Maintenance and Repair (M&R) requirements are the responsibility of the Test Site Program Manager and the cognizant technical code for the respective site or equipment.

Class 3 & 4 M&R requirements are for planned maintenance, required repair and periodic replacement of equipment consumable items and parts. M&R funds are budgeted overhead funds allocated for the upkeep of facilities and equipment to ensure the continued capability to perform required equipment or system testing.

Facility Data Sheets are required to be kept for all test sites and will include the anticipated M&R requirements for the current fiscal year and projections for an additional 3 years. Facility Data Sheets will also include physical characteristics of the test site, CPP (Capital Purchase Program) requirements, utilities requirements, IT/network/TOACC requirements and a description of anticipated usage.

MILCON

The MILCON process is a long-lead time (3-years minimum) construction project for facilities costing more than $1 Million. It includes both Military Construction and Minor Construction Projects. The funding request year should be approximately 12 to 18 months before the facility actually needs to be operational. A DD Form 1391 is used for MILCON submittals, and the requesting code works closely with Code 36 in preparing it. It then gets reviewed at the Division level, NSWC level and the NAVSEA/ NAVFAC level. If the project rating is high enough, it goes to the CNO N44 Shore Facility Program Board. CNO N44 recommends programs to Congress for budgetary approval. The design process would happen concurrently with the budgeting process, which can take as long as 18 months to complete.

CAPITAL PROCUREMENT PROGRAM

The Capital Procurement Program (CPP) can be broken down into four major events or evolutions:

- Development, updating and prioritization of required CPP projects at the Directorate level.
- Collation and prioritization of Directorate CPP proposed projects at the Division level and the development of a single Division CPP package forwarded to NAVSEA to be included in the Navy CPP budget submission.
- Authorization to execute the CPP program.
- Execution of CPP projects at the Directorate level in accordance with the plan and within the established financial constraints.

There are three types of CPP categories: equipment with a value greater than $100K; ADP equipment with a value greater than $100K; and, minor construction (MINCON) with a value greater then $100K but less than $500K. CPP dollars are NSWC overhead funds that require authorization of Congress to execute and are considered long term capital investments that must be depreciated. Funds authorized for execution in a given FY are expiring funds and must be obligated by the end of that FY. With proper scheduling, tasks can be carried over into the next FY.

The process flow chart "Capital Procurement Program (Proposals)" provides a sequence of events, at the macro level, which must be accomplished by the Directorate in order to meet the annual CPP data call. The Directorate CPP coordinator has the overall responsibility to ensure that external and internal guidance, criteria, and schedules are promulgated throughout the Directorate and that a final plan is forwarded to the Division. Department points of contact represent and champion specific CPP projects and develop project documentation in accordance with the established criteria. The Directorate Head will have final review and establish priorities. The final plan is then developed and forwarded to the Division.

At the Division level the Corporate Investment Board (CIB) will review, further prioritize, and recommend projects for execution within established budget limitations. In general, the limitation on Division CPP funds has been at the $10M level. The CIB will try to ensure that each Directorate receives its fair share of this money while balancing Division and Directorate strategic goals and requirements. The CIB chair develops the proposed Division plan and presents it to the Business Director for review. The Business Director presents the plan to the BOD for review and concurrence prior to formal presentation to the Division Commanding Officer for approval. The plan is then forwarded to NAVSEA 07 for review and inclusion into the overall NAVSEA CPP plan.

NAVSEA 07 forwards the CPP plan to Navy FMB (formally Navy Comptroller) for inclusion into the overall Navy budget requirements. FMB forwards the Navy budget to the Office of the Secretary of Defense (OSD) for inclusion in the DOD budget submit to Congress. Authority to expend CPP dollars is established with the release of the President's budget.

The process flow chart "Capital Procurement Program (Execution)" provides a sequence of events in the execution of CPP funds. Project POC's should review and validate current year projects and develop an execution plan which is forwarded to the Directorate CPP coordinator. While execution changes can occur at this point, it is not advisable to deviate from the plan. Changes and/ or deletions must be brought to the coordinator who will recommend further action. Code 9009 will receive and issue labor and material job order numbers to current year, approved CPP projects for execution. The Directorate CPP Coordinator will also track funds expenditures. The project POC will provide monthly progress reports to the CPP Coordinator. All funding must be obligated by the end of the current FY.

MACHINERY IN-SERVICE ENGINEERING DIRECTORATE

BUDGET PROCESS

A budget is a statement of the financial status of the organization for a defined period of time based on estimates of expenditures for the fiscal year. A budget is also a plan for the coordination of resources and expenditures, including the amount of funds available for, required for, or assigned to a particular purpose. Every organization and business, no matter how large or small, has some form of a budget. Finance and budgeting are primary elements of our Directorate's Business Plan. The format for budget preparation, execution and tracking varies from organization to organization.

The budget process used in Directorate 90 consists of the following processes. Each step in the process is a key indicator for planning the Directorate's financial business in the upcoming fiscal year.

- Labor Disk - The Labor Disk is an automated program used by the Directorate to develop direct ratio goals by Department for the fiscal year. The program also calculates average onboard for direct and IOH. The average onboard is used to set direct hour goals, and IOH labor and non-labor budgets.

- A-11 Budget - The A-11 serves as the President's budget call. All activities operating under the Navy Working Capital Fund (NWCF) annually prepare an A-11 budget submission. Once the Comptroller issues the A-11 budget data call, the Directorate gathers the required financial data, which includes workyears and hours in the following categories: Direct, Unburdened, SCC, IOH, G&A, and Leave hours. Each of these categories are broken down into labor and non-labor costs. When completed, the A-11 budget submission is sent to the Comptroller who is responsible for coordinating the A-11 submission for the activity. The A-11 budget is submitted to the Office of the Assistant Secretary of the Navy (OASN), then to the Office of the Secretary of Defense (OSD, and Office of Management and Budget (OMB) before being included in the President's budget submission to Congress.

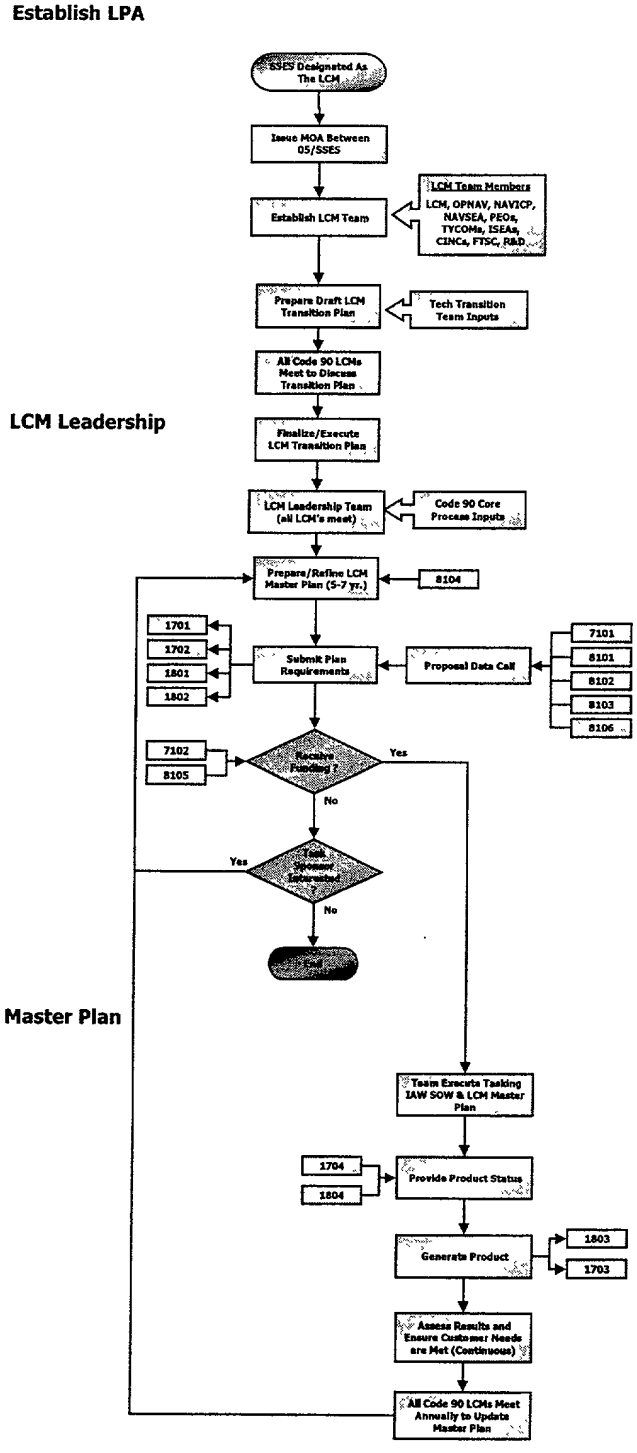
- Operating Budget - The Operating Budget consists of Direct Hours (ST/OT) by Department; OH Labor allocations by Department; and OH Non-Labor allocations by Department for Travel, Training, Consumables, Assets, and Minor Maintenance contracts. The Class 3 and 4 M&R approved budget is incorporated into the Operating Budget. The Operating Budget is distributed to the Department Heads to execute throughout the fiscal year.

- Budget Execution - Department Heads assign budgets to their Branches/Sections which are executed throughout the fiscal year and tracked on a bi-weekly basis. Quarterly budget reviews are conducted. Adjustments are made to the Operating Budget throughout the fiscal year as required.

Life Cycle Management

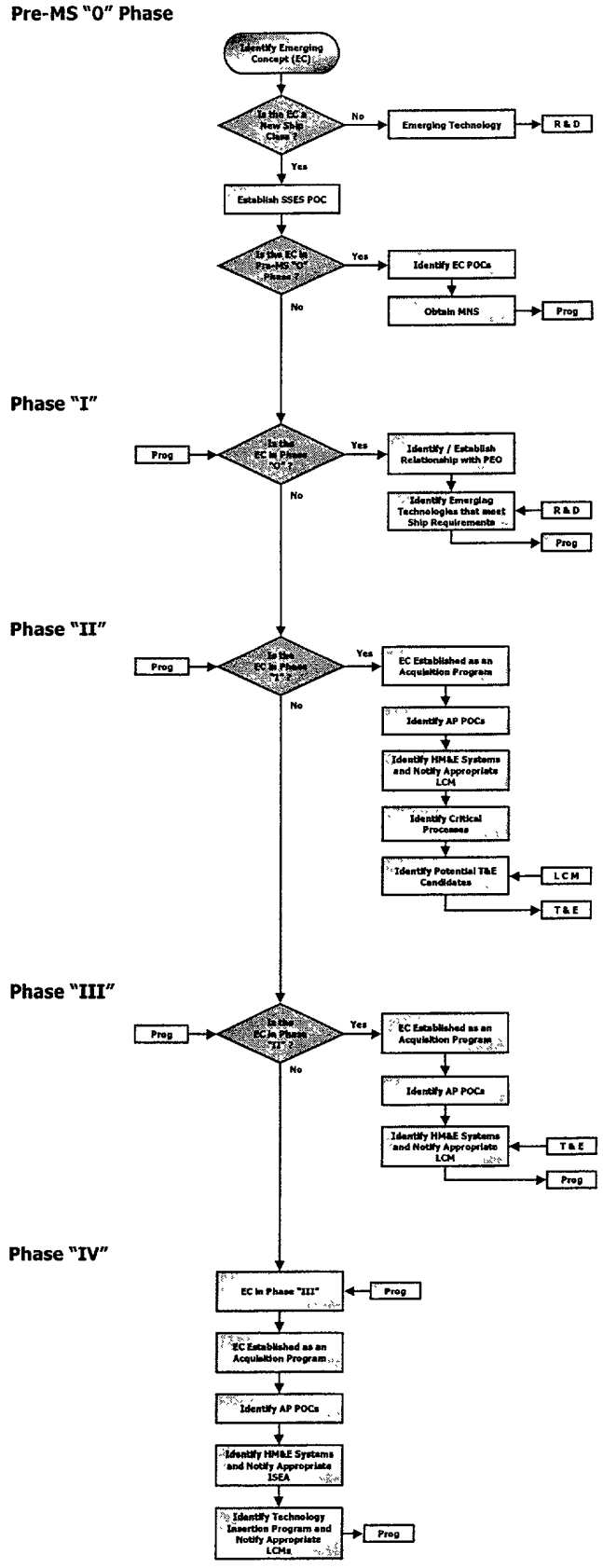
APPENDIX B

FLOW CHART B-1



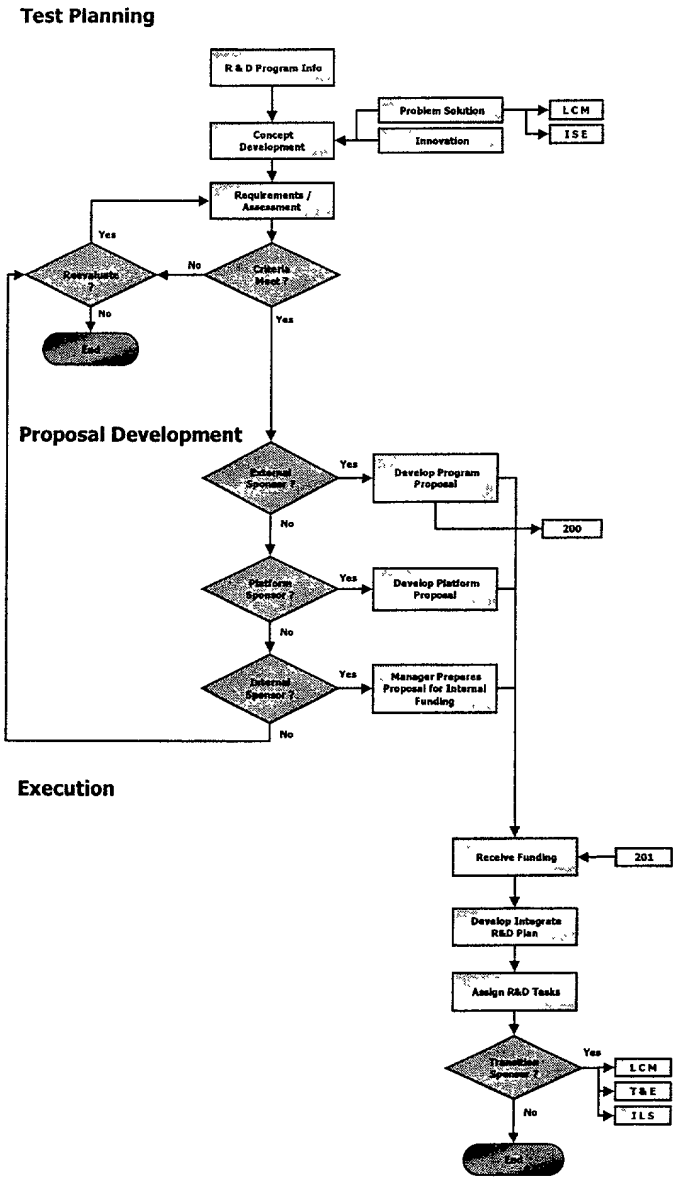
Acquisition

FLOW CHART B-2

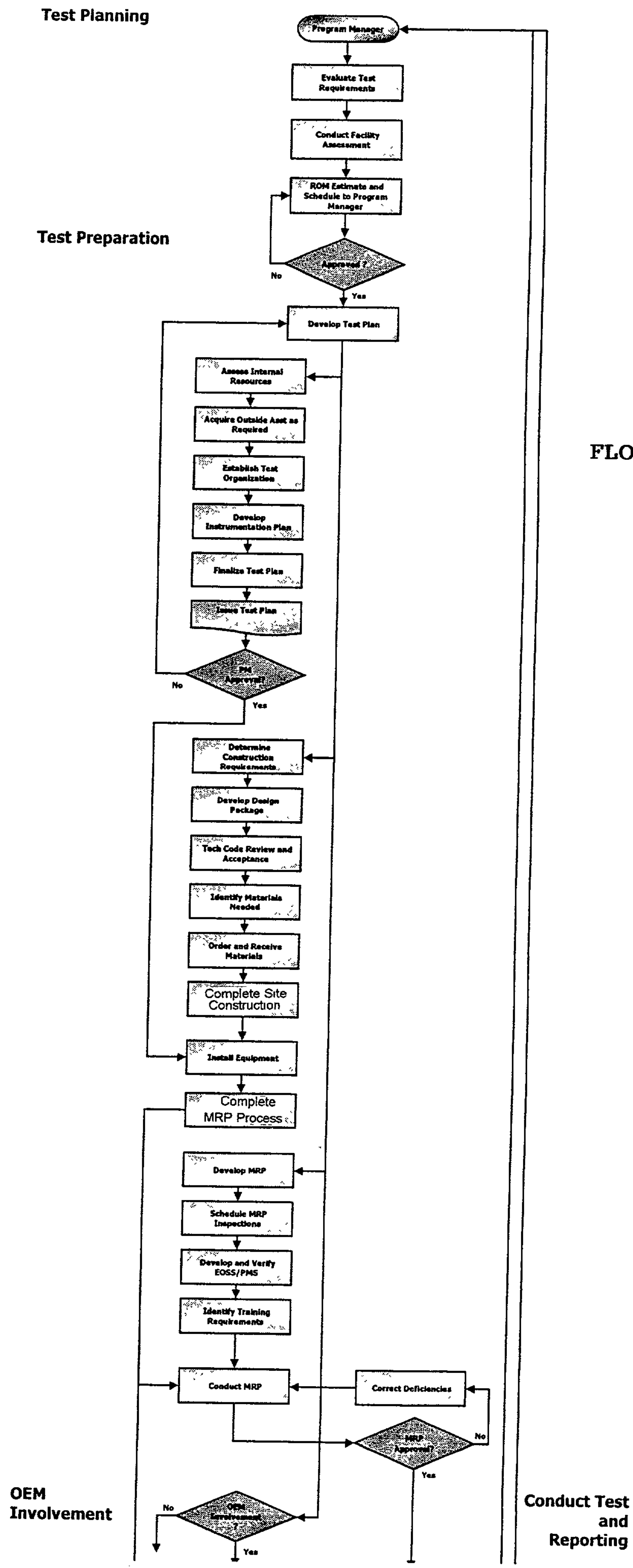


Research and Development

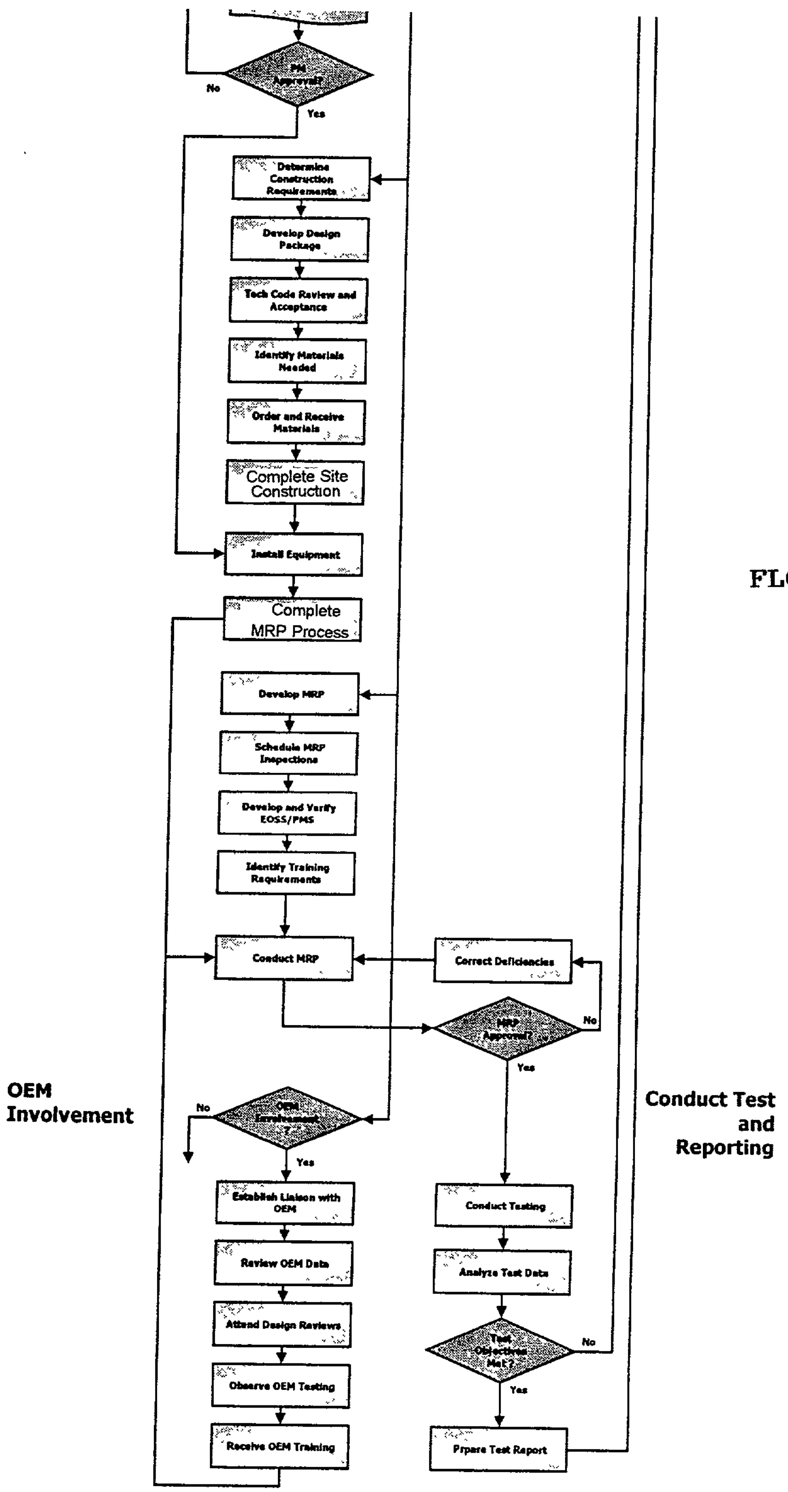
FLOW CHART B-3



Test and Evaluation Process (LBES)



FLOW CHART B-4a



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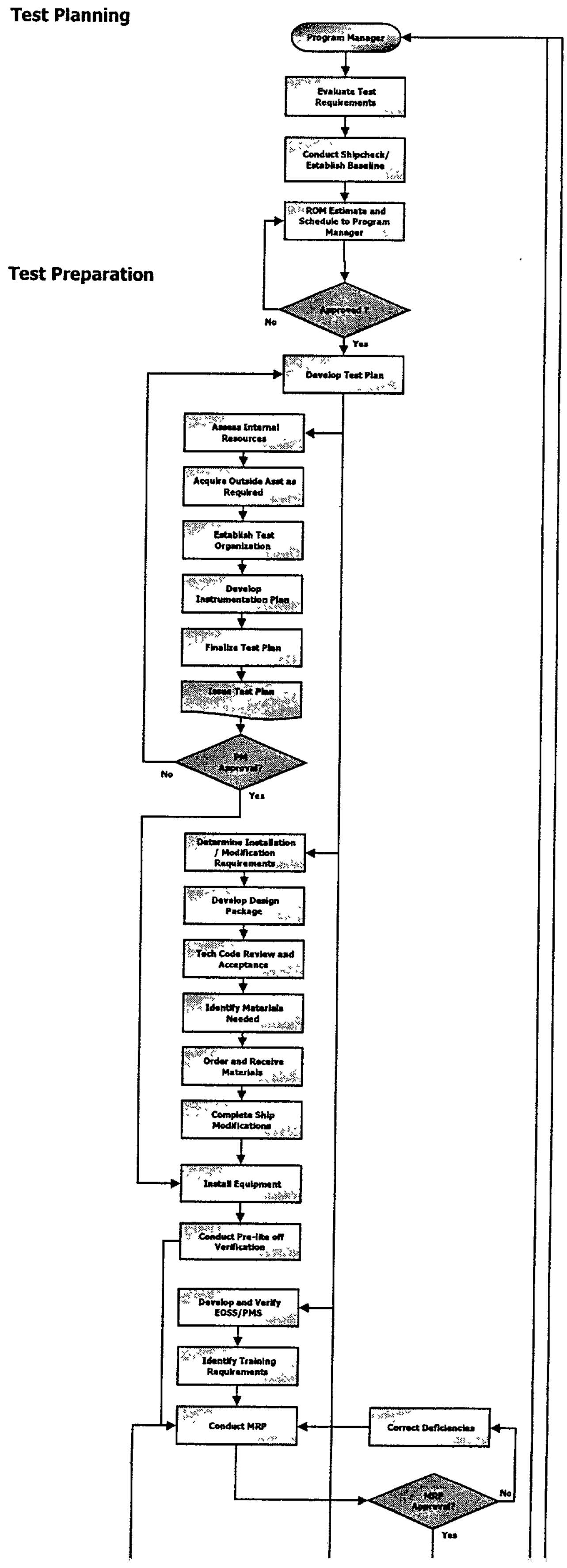
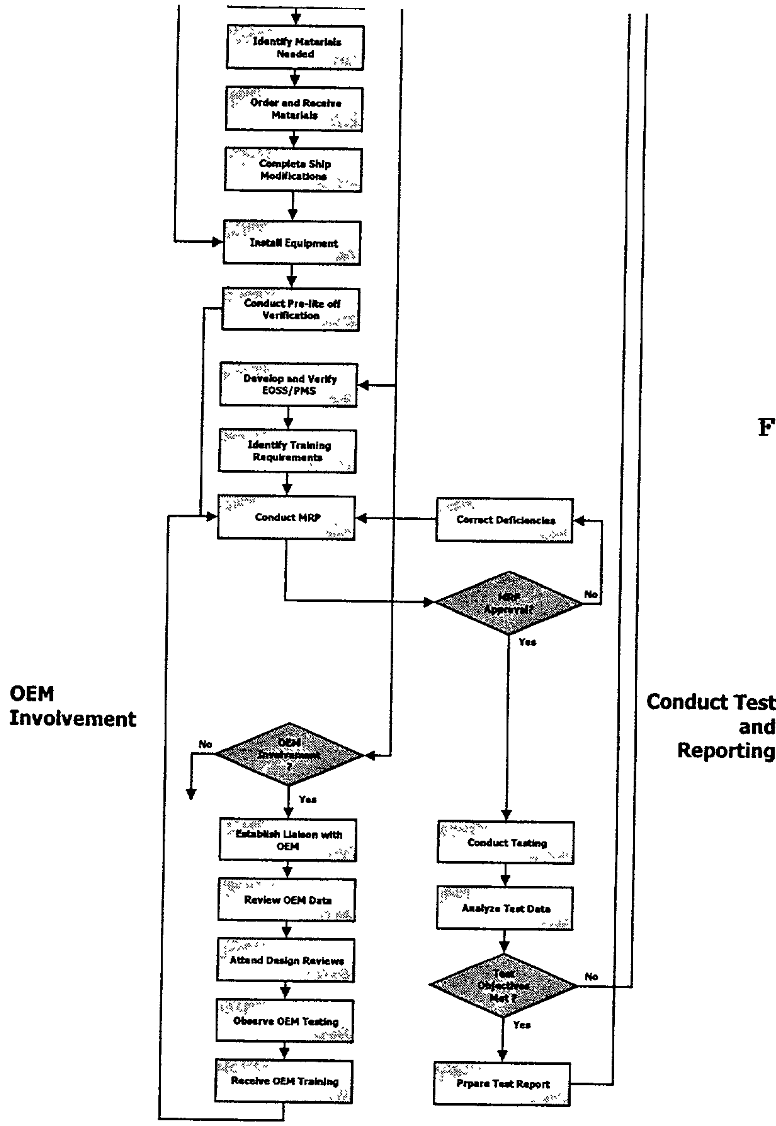
Test and Evaluation Process (Shipboard)



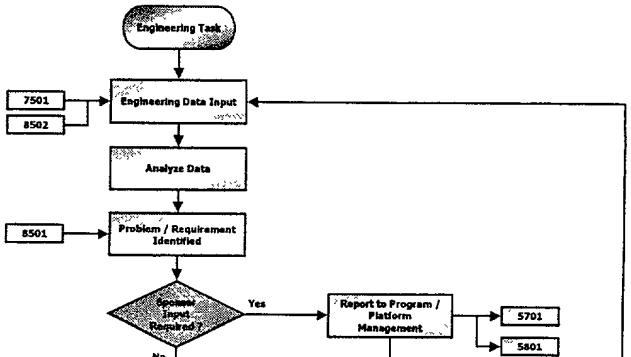
FLOW CHART B-4b

FLOW CHART B-4b (CONTINUED)

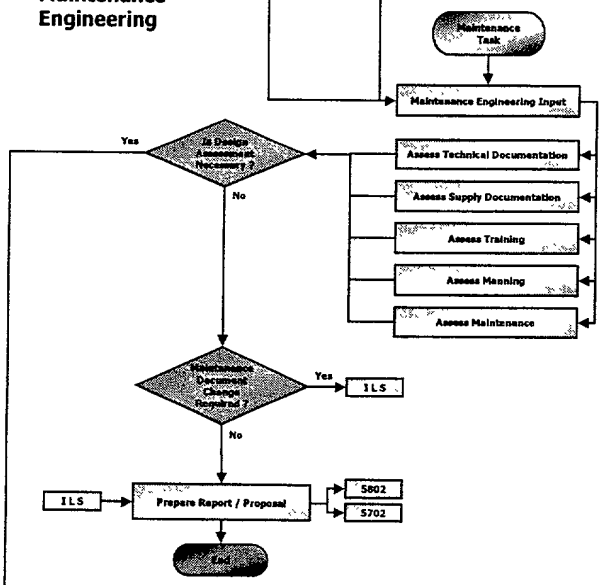


In-Service Engineering

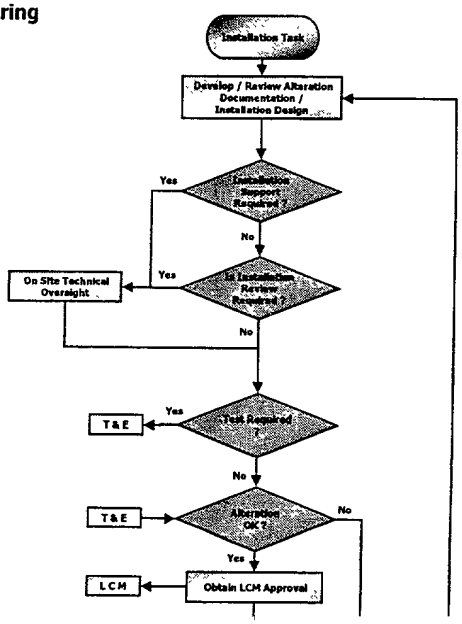
Data Analysis/Data Management



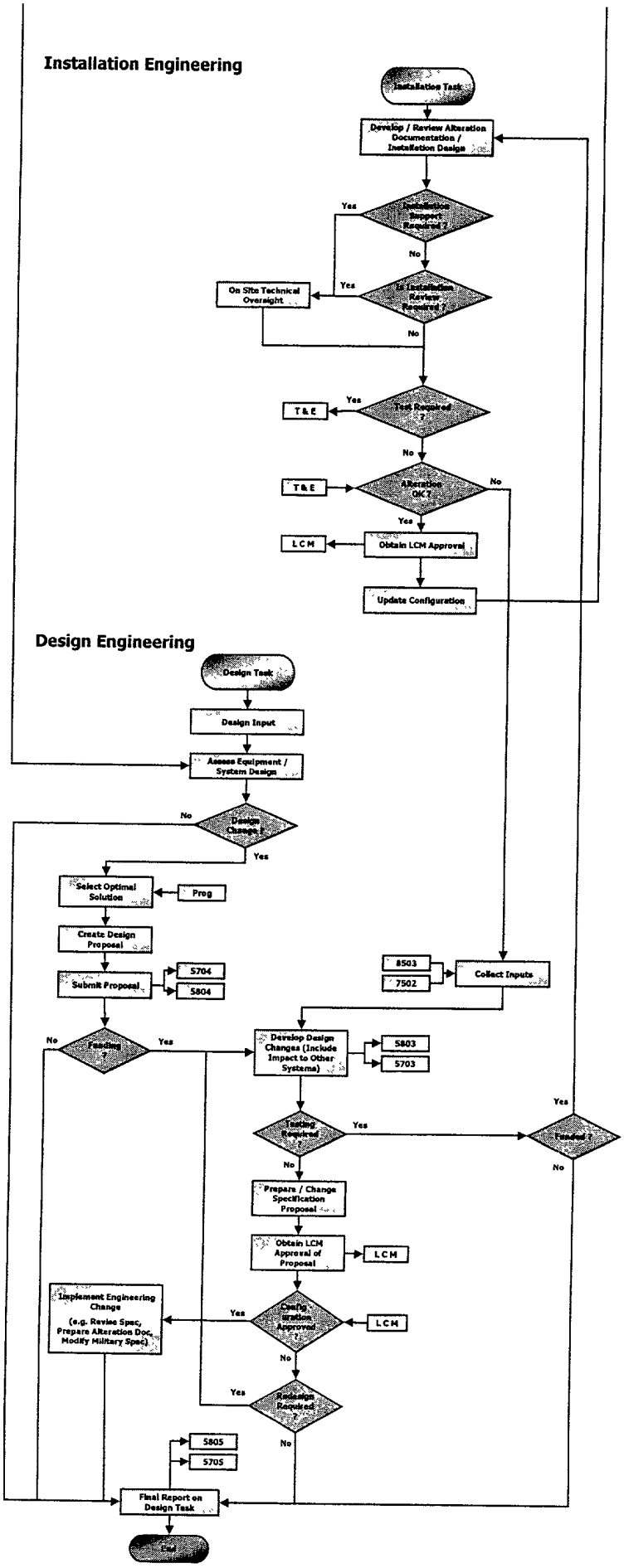
Maintenance Engineering



Installation Engineering



FLOW CHART B-5a



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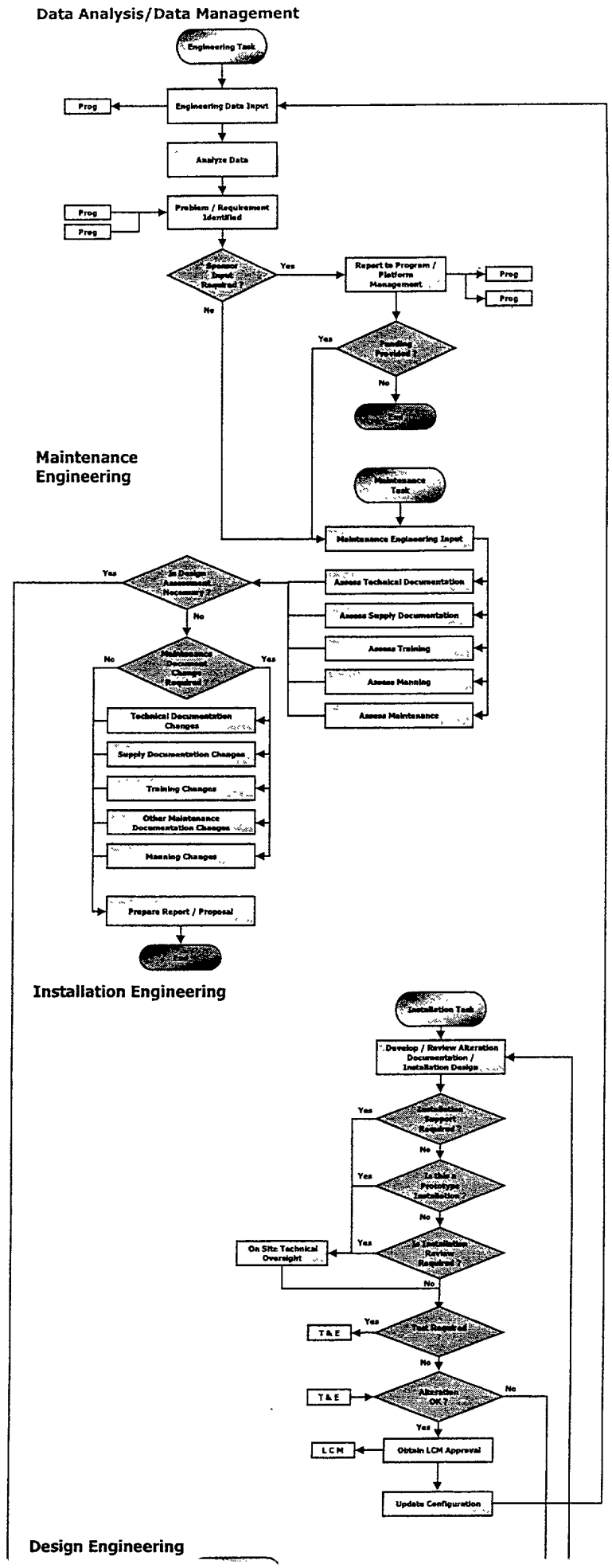
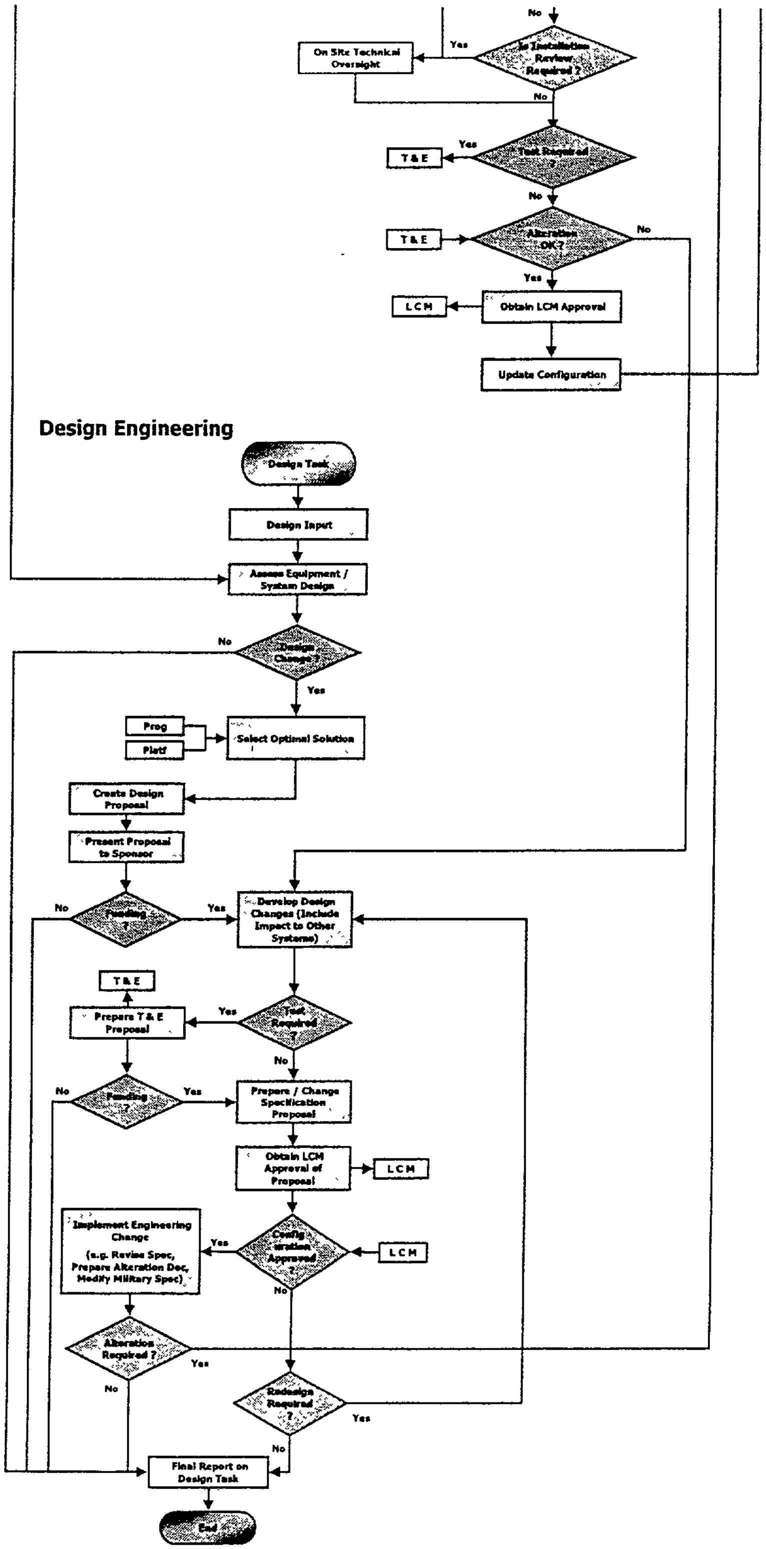
In-Service Engineering



FLOW CHART B-5b

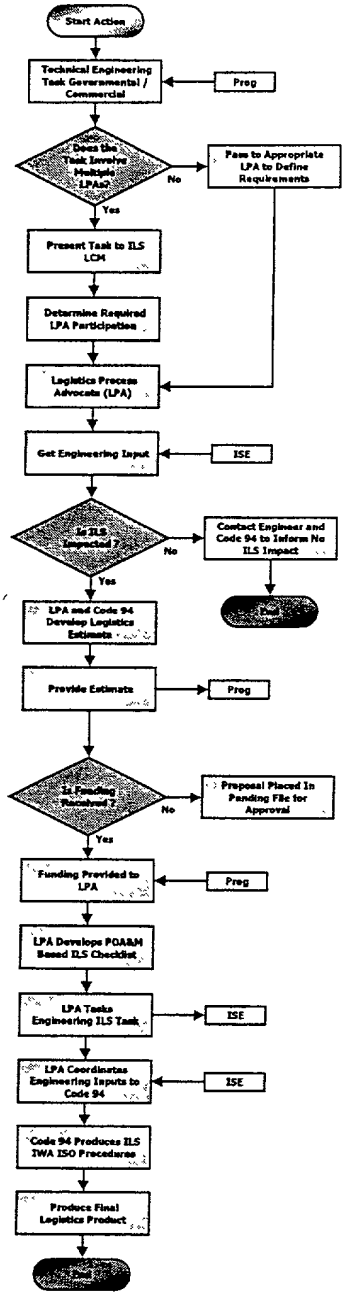


FLOW CHART B-5b

(CONTINUED)

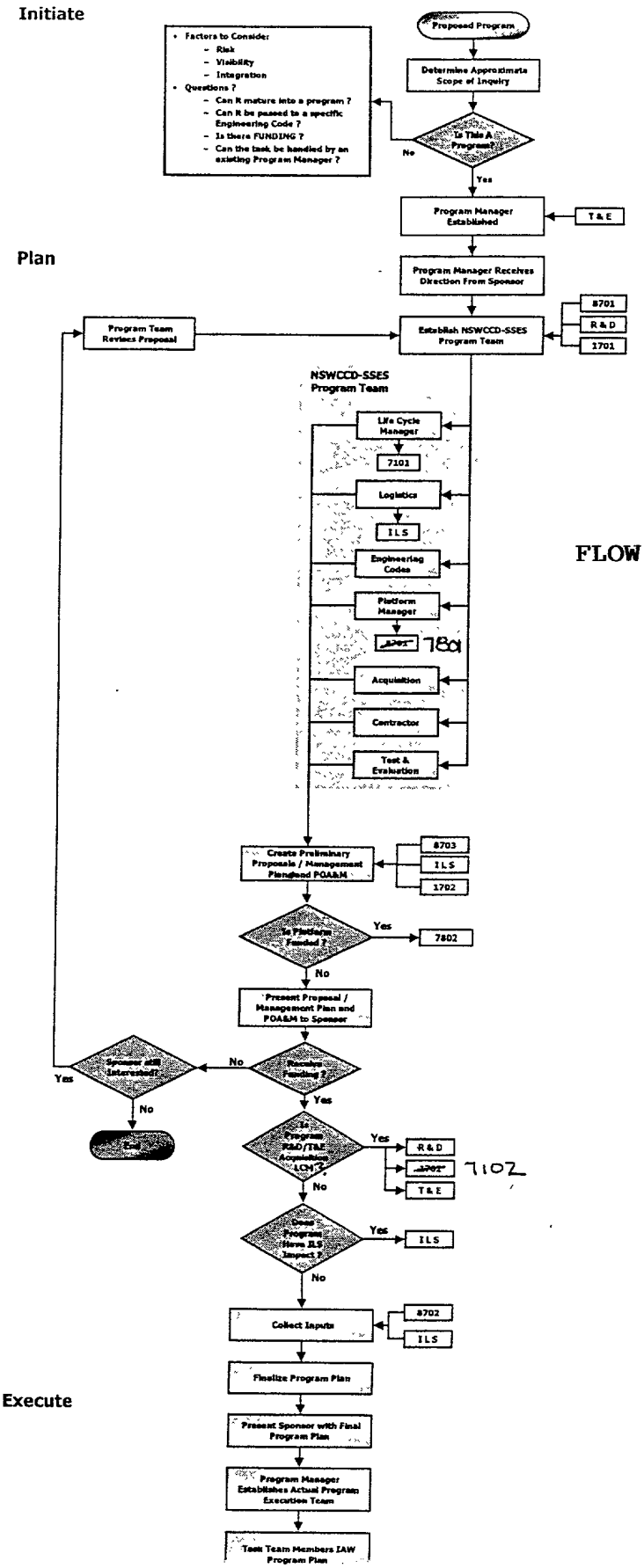
Integrated Logistics Support

Test Planning



FLOW CHART B-6

Program Management



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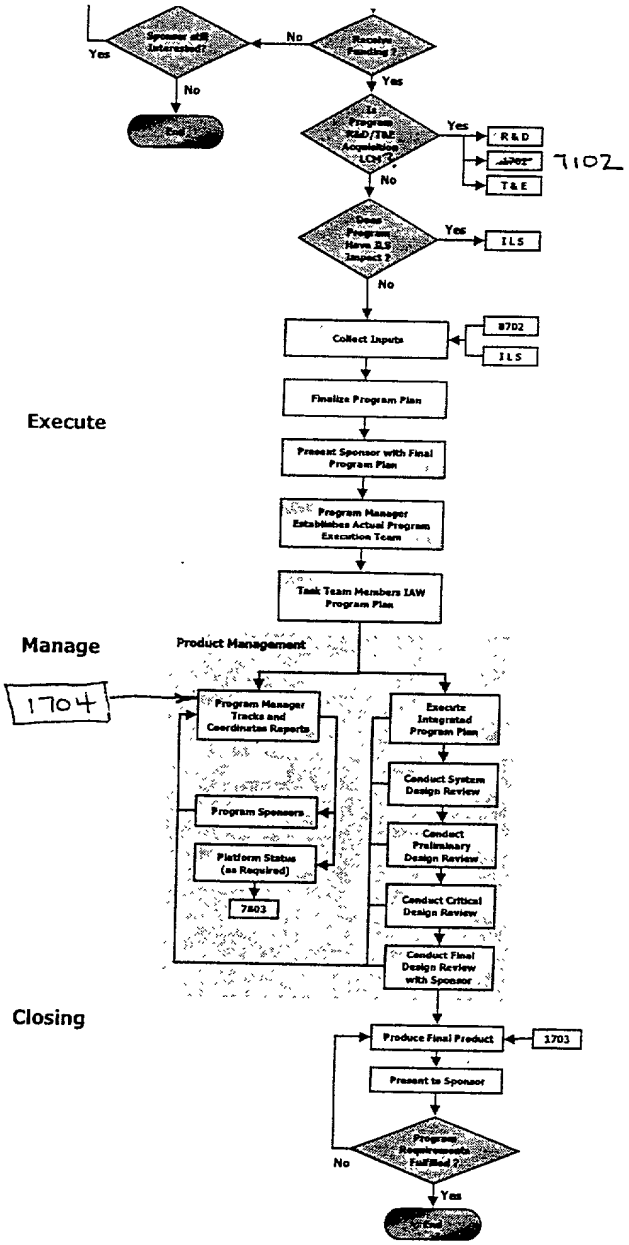
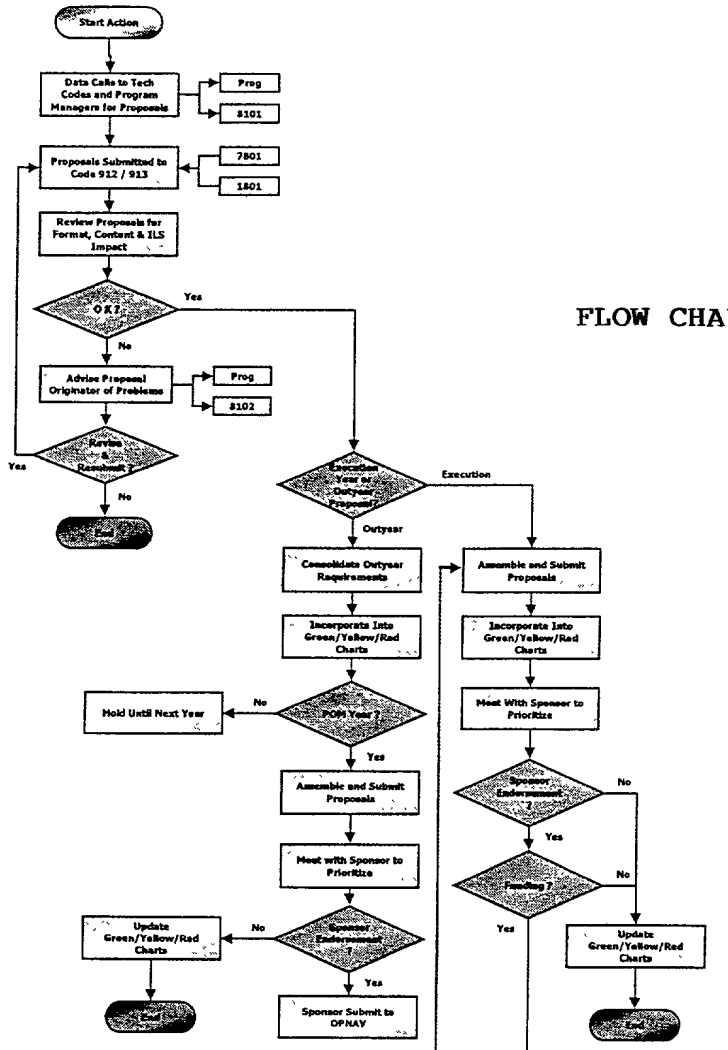


FLOW CHART B-7
(CONTINUED)

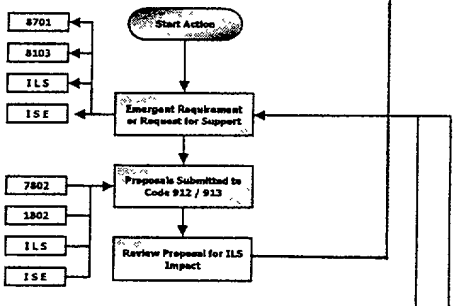
Platform Management

FLOW CHART B-8

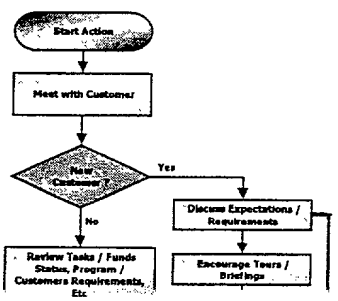
Planned Tasks

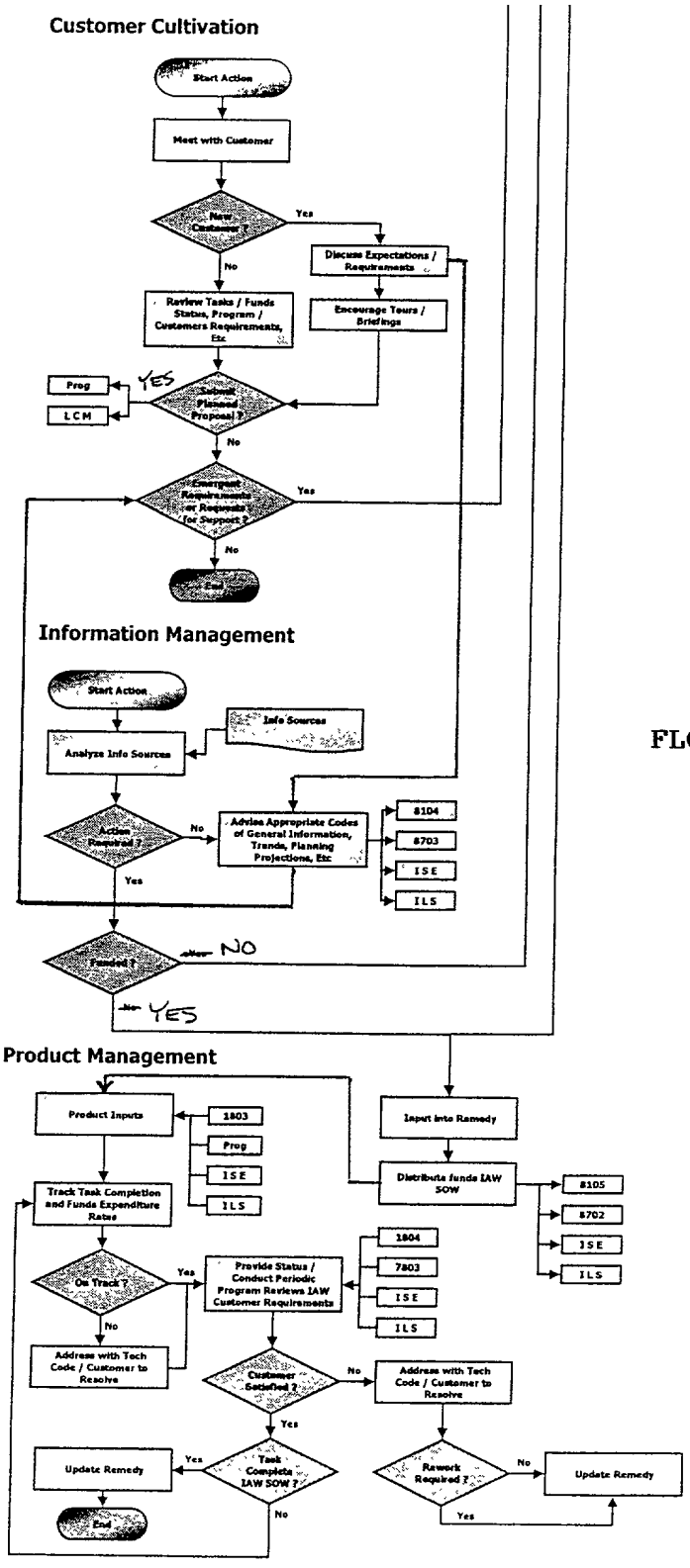


Unplanned Tasks



Customer Cultivation





FLOW CHART B-8
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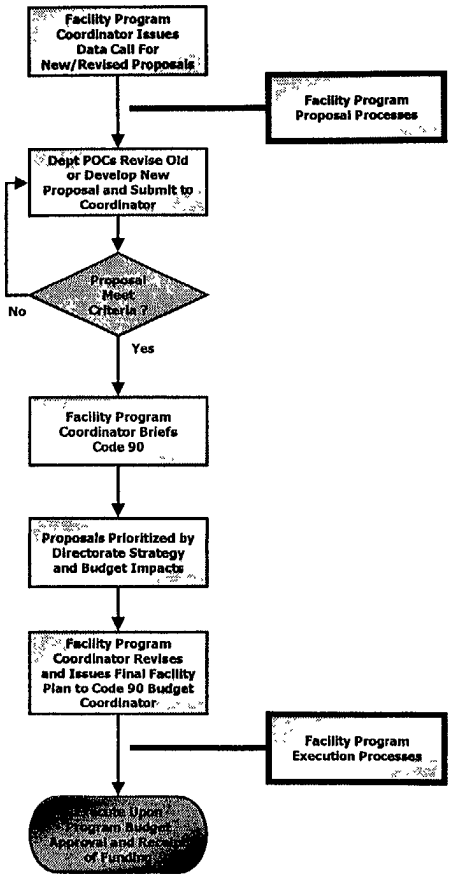
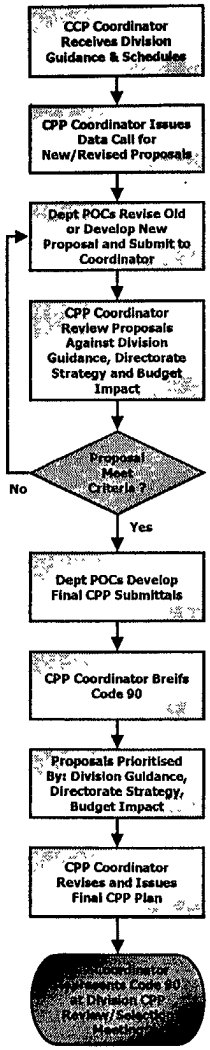
Facilities

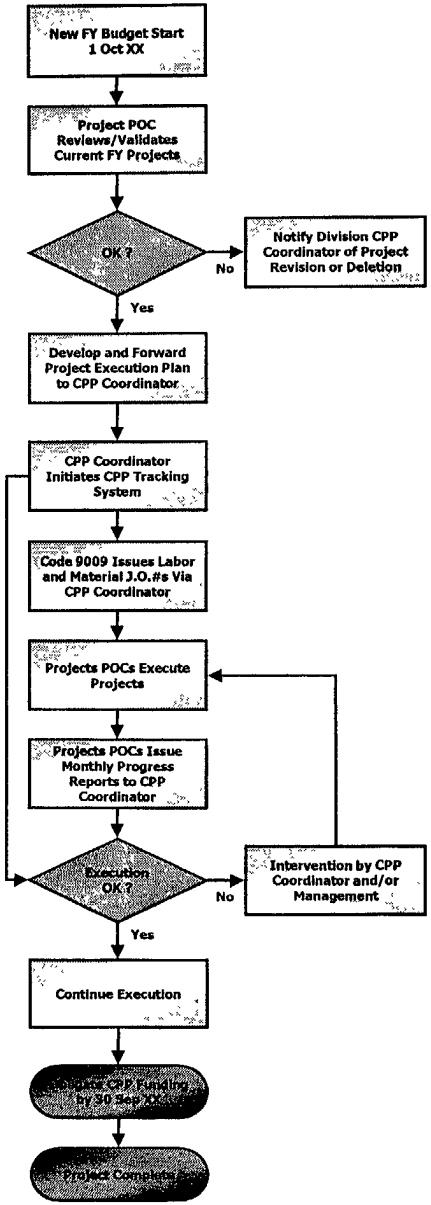
Facility Program



Capital Procurement Program (Proposals)

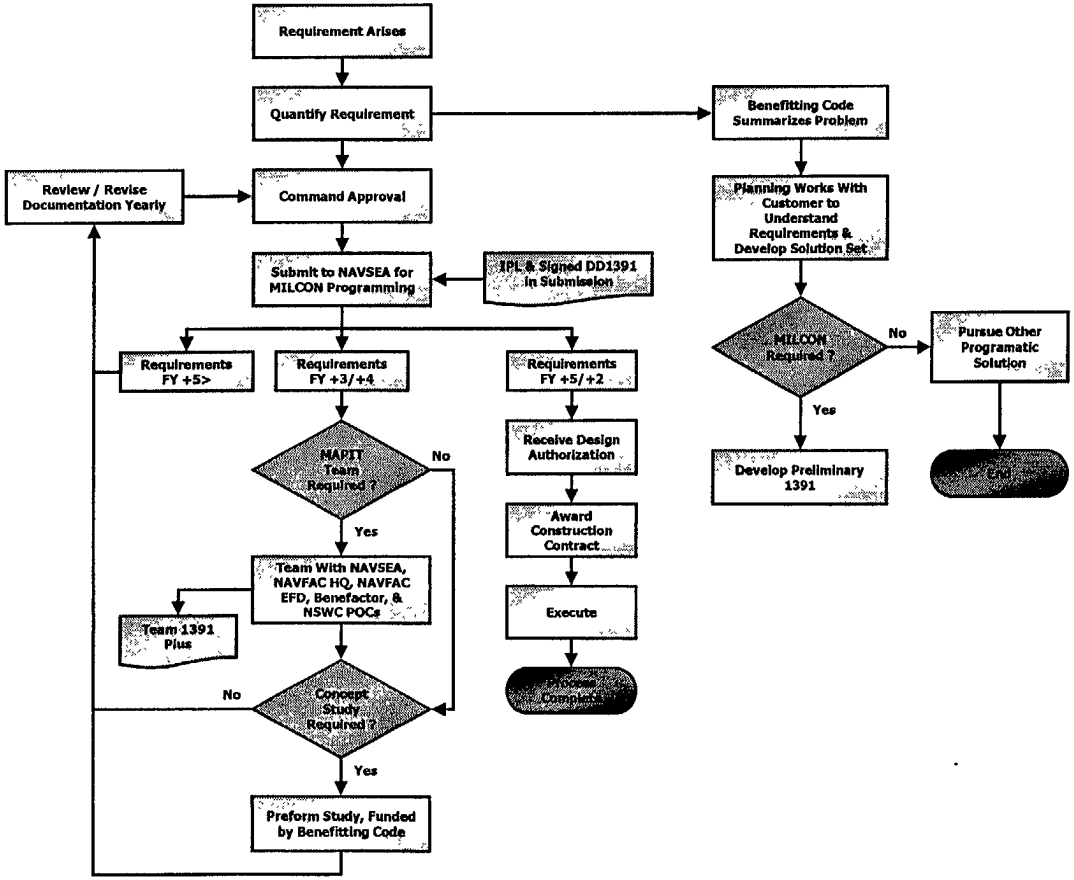


Capital Procurement Program (Execution)

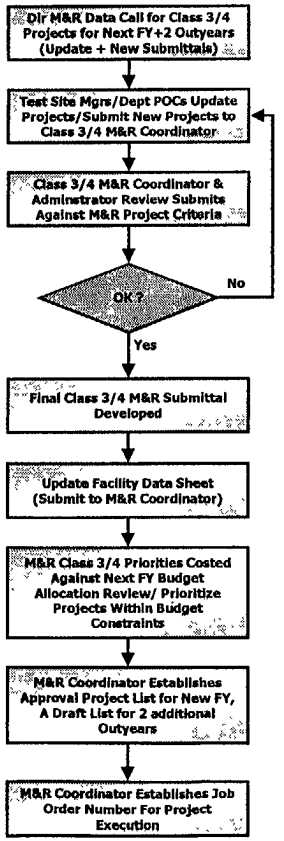


APPENDIX C
FLOW CHART C-1

MILCON



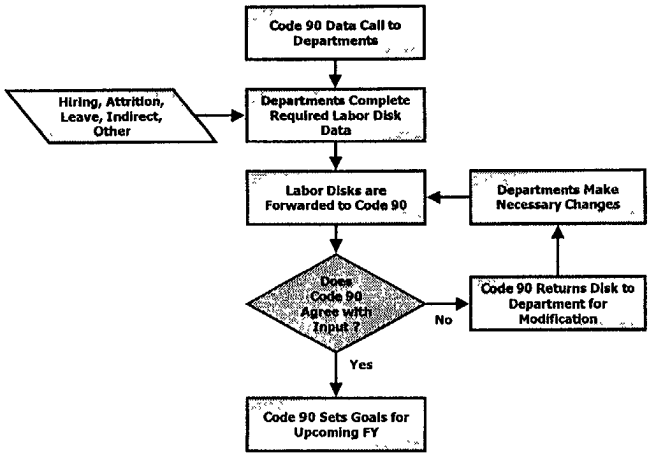
Maintenance & Repair (M&R)



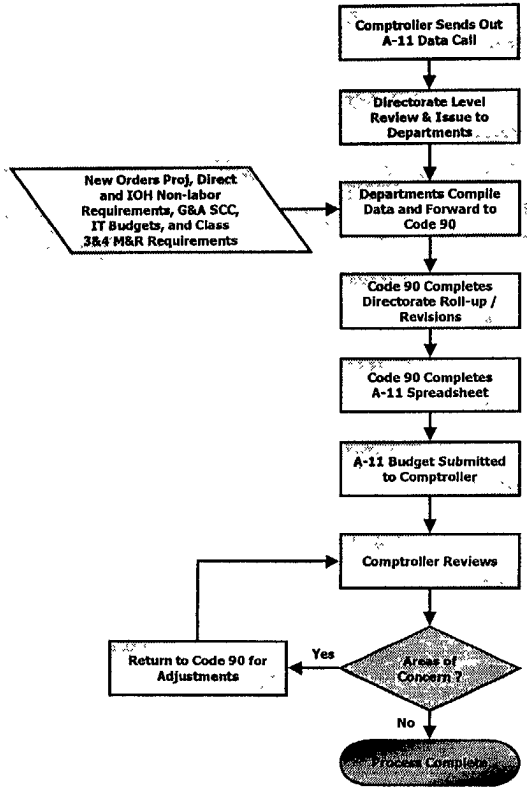
FLOW CHART C-1 (CONTINUED)

Budget

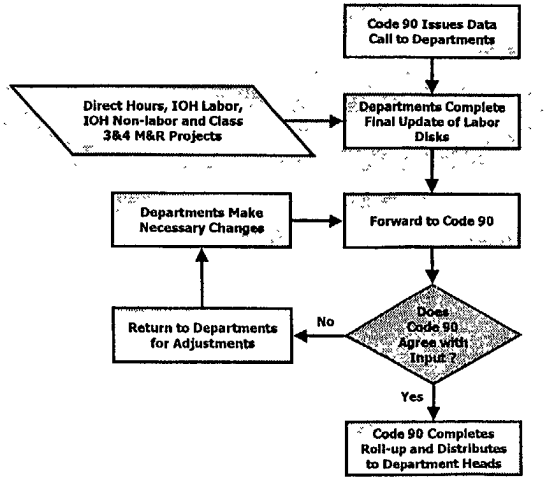
Labor Disk Process



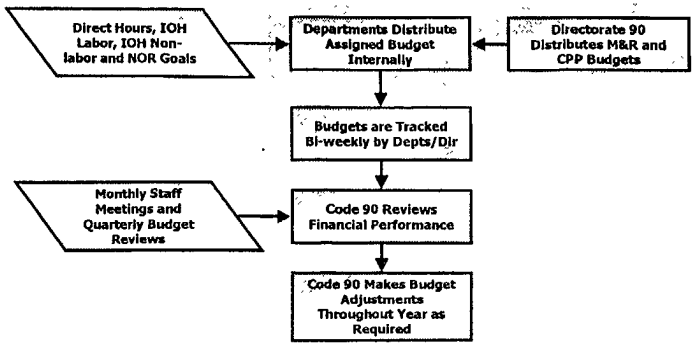
A-11 Budget Process



Operating Budget Process

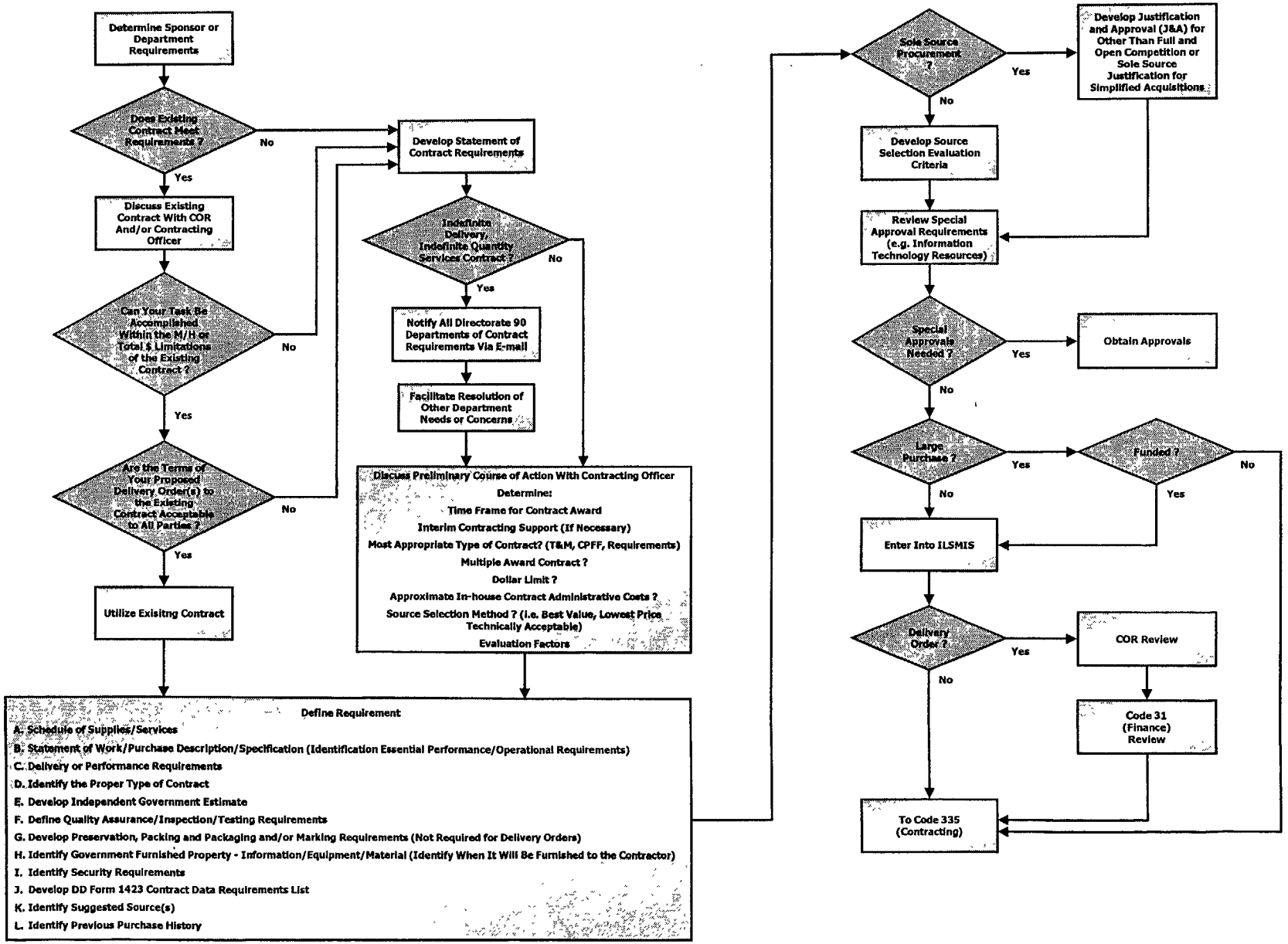


Budget Execution Process



FLOW CHART C-2

Contracting Process



FLOW CHART (C-3)